# ENGINEERING and MINING JOURNAL.

VOL. XXVI., No. 10.

RICHARD P. ROTHWELL, C. E., M. E., } Editors.
ROSSITER W. RAYMOND, Ph. D., }
Gen. FRANCIS L. VINTON, M. E., Superintendent of Western Office.

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL, P. O. Box 4404, New York. Articles written by Mr. RAYMOND will be signed thus *

Business communications for the Western Department should be addressed to the Western Office at Denver, Colo.

THE SCIENTIFIC PUBLISHING CO., PUBLISHERS,
27 Park Place, New York.


CONTENTS.


| EDITORIALS: | PAGE. |
|---|---|
| The Lowe and the Strong Gas | 163 |
| Physics and Hydraulics of the Mississippi | 163 |
| The Rarer Metals at the Paris Exposition | 164 |
| The Friction of Water in Pipes | 164 |
| New Gas Furnace at Couillet Rolling Mills, Belgium | 165 |
| The Mode of Combustion in the Blast-Furnace Hearth | 165 |
| The Mode of Duplex Transmission | 166 |
| The London Gas Supply | 167 |
| The Metallurgy of Nickel | 167 |
| Compressed-Air Locomotives for Mines | 168 |
| New Patents | 168 |
| Ruby Camp, Hardscrabble District, Colo. | 168 |
| On the Manufacture of Briquettes (Patent Fuel) in the Aachen District | 168 |
| Nevada Mines | 169 |
| On Ventilating Shafts in Coal Stores | 169 |
| How to Live and Make a Fortune in the San Juan (Colo.) Silver Mines | 169 |
| Georgia Gold Mines | 170 |
| The Mallett Reduction Works of Canon City, Colo | 170 |
| Mining News | 171 |
| NOTES: | |
| The Real Inventor of the Telephone | 170 |
| The Electric Light at the Gaiety | 170 |
| Pension to Dr. Prescott Joule | 170 |
| Niello | 170 |
| Fossil Saurians | 170 |
| A New Form of Metallic Copper | 171 |
| Artificial Production of Crystal of Silica and of the Silicates | 171 |
| Electro-Metallurgy of Cobalt | 171 |
| Volcanic Phenomena | 171 |
| Cast Manganese | 171 |
| Electric Light | 171 |
| Determination of Manganese in Irons, Cast-Irons, and Steels; in Spiegel, Ferro-Manganese, and Ores | 171 |
| STATISTICS OF COAL PRODUCTION | 173 |
| COAL TRADE REVIEW | 173 |
| FREIGHTS | 174 |
| IRON MARKET REVIEW | 175 |
| METALS | 176 |
| FINANCIAL: | |
| New York Stocks | 177 |
| Miscellaneous Stocks and Quotations | 177 |
| Philadelphia Stocks | 177 |
| Gas Stocks | 179 |
| Copper Stocks | 179 |
| Gold and Silver Stocks | 179 |
| Advertisers' Index | 180 |


## NOTICE.

THEODORE F. VAN WAGENEN, of Denver, Colo., is no longer connected with the ENGINEERING AND MINING JOURNAL or the Scientific Publishing Company, and is not authorized to collect moneys or transact any business whatever for the same.

## THE LOWE AND THE STRONG GAS.

The American Gas-Fuel and Light Company has issued a very interesting and instructive pamphlet, treating of the Lowe illuminating-gas and the Strong fuel-gas, both of which it controls by arrangements with the patentees. The pamphlet contains complete descriptions of the processes, historical notices of their introduction and test in practice, and scientific reports by Prof. HENRY WURTZ and Prof. GIDEON E. MOORE, on the conditions of the manufacture and the quality of the product. We need hardly say to our readers that the excellence and cheapness of the Lowe gas are now too thoroughly demonstrated to be put in doubt by any conspiracy or trick. Probably the gentlemen of the Philadelphia Gas Trust, who lent themselves, for political or worse reasons, to such a performance in the case of Manayunk, have had reason to regret their action since. Certainly the exposure of their doings, which this pamphlet furnishes, must be an intolerable annoyance to them, even if they are so philosophical as not to deem it a disgrace—like the man who stood in the pillory, not caring for the punishment, but suffering from the sunshine.

Meanwhile, the gas is produced to the satisfaction of consumers and the profit of manufacturers at Phœnixville, Conshohocken, Fort Plain, Clyde, Lancaster, Harrisburg, Indianapolis, and Baltimore. Everywhere its introduction has forced the coal-gas companies to make enormous reductions in their prices—as at Baltimore, where the old company charges $1.50 per thousand, and furnishes better gas than ever before, but it can not win back the 4400 consumers who prefer Lowe gas at $1.90. If the old companies can afford, as they assert they can, to make such reductions, a strong light is thrown on the amount of their previous profits. With regard to the use of water-gas as fuel, the experimental tests have been less extensive; but their results are favorable. Having already had much to say on this subject—on which, moreover, a paper by one of the editors of THE ENGINEERING AND MINING JOURNAL is shortly to be read before the Iron and Steel Institute of Great Britain, we will indulge in no further comment at present, but recommend the pamphlet before us as an exceedingly valuable compendium of facts and figures.

One chapter in it, however, deserves particular notice—namely, the very clear discussion by Mr. GEORGE S. DWIGHT, of the sanitary relations of carbonic oxide in illuminating and fuel gases. This is a question of great scientific as well as practical interest; and Mr. DWIGHT makes out a strong case for the proposition that the actual effects of this compound are less instantaneous and fatal than has been generally asserted—differing, indeed, in kind as well as degree, from what certain authors have laid down—and, moreover, that the peril from its use is no greater than that involved in using ordinary illuminating-gas. There is danger connected with all combustion, or generation of combustible gases. Charcoal fires and coal-fires occasionally poison people, and often lead to conflagrations; common gas destroys, now and then, a careless or ignorant victim by suffocation or explosion. The danger from water-gas is scarcely greater in any respect, while in some respects it is notably less. A very important—perhaps overwhelmingly important—point in its favor is the fact that in combustion it is far less detrimental to the quality of the surrounding atmosphere, from which it takes less oxygen. At the end of this pamphlet two letters are given, from Prof. FRANKLAND of London, and Prof. WURTZ of Paris, which confirm the position taken by Mr. DWIGHT, and will be profitable reading to those gas-experts who, in the interest of the old companies, have assailed him on scientific and sanitary grounds. *

## PHYSICS AND HYDRAULICS OF THE MISSISSIPPI.

Mr. JAMES B. EADS, C.E., contributes to the September number of *Van Nostrand's Magazine* a review of the report of HUMPHREYS and ABBOTT on this subject, which was made in 1861, and has recently been republished by the Government. Of course Mr. EADS is justified in criticising this report, and disproving its conclusions if he can. The style which he may choose to adopt in doing so is a matter of taste and policy. We think that he would have shown both bad taste and bad policy in assuming the tone of contempt and sarcasm, even if his contempt had been justified and his sarcasm well directed. But neither of these conditions is fulfilled; and the attempt of Mr. EADS to show up two eminent, painstaking, skillful, and disinterested engineers as charlatans, ignorant of the first principles of mechanics, recoils upon himself.

The Mississippi itself is not muddier than his argument. He sets himself to controvert two propositions, which are fatal to his own theories and schemes. The first is, that the greatest velocity of the current of the Mississippi does not correspond to the greatest proportion of sediment carried by it. This was proved by HUMPHREYS and ABBOTT, through experiments showing that the quantity of sediment per cubic foot of water is not proportional to the velocity of the water. But Mr. EADS claims that because the greatest velocity is coincident, other things being equal, with the greatest volume of the stream, therefore the basis of comparison should be the total quantity of sediment carried by the stream. The absurdity of this claim is apparent at once. The practical question is not whether a big river carries more sediment than a small one, but whether the same amount of water moving rapidly carries in this case more sediment than when it moves slowly, and whether the amount of suspended matter is proportional to the velocity. Evidently what is true of an average cubic foot of the mass of water is true of the whole mass.

Here is a specimen of Mr. EADS'S reasoning on the subject:

"If the mean current at Columbus was six feet per second, an entire section of the river six feet long must have moved at that place and time through the space of six feet; and the force expended was therefore the entire force due to the motion of this whole section during that second. * * * * If we multiply the cross-section of the river, in square feet, by the current in linear feet per second, the product would be the number of cubic feet in the section; and these, multiplied by the number of grains of sediment in one foot, would give the proper amount for comparison with the current."

Mr. EADS does not seem to see that if the quantity of water passing down the river remained the same, the cross-section would diminish in proportion to the increase of its rapidity; and hence, that the result of his calculation would be exactly the same as that of a calculation based upon a single cubic foot. If $Q$ be the number of cubic feet passing a given point per second, and $V$ be the velocity in linear feet per second, $\frac{Q}{V}$ will be the cross-section. So long as $Q$ is constant, any increase in $V$ will proportionally reduce the value of $\frac{Q}{V}$. Now the quantity of water passing down the Mississippi is supplied by Nature. The question therefore is, if this quantity were made to move faster, would it carry a proportionately larger quantity of sediment? Messrs. HUMPHREYS and ABBOTT have demonstrated that the whole mass would not do so, because each cubic foot of it does not. Mr. EADS takes unnecessary pains to construct from their data a new diagram, showing that, although the *proportion* of sediment does not vary as the velocity, the total amount of sediment does vary (roughly) as the total amount of water; and as these observations were made upon changes in velocity due wholly to the varying supply of water, and not to change of grade, he establishes in this way an apparent relation between total sediment per second and velocity. But if the velocity were made to vary by any other cause than the quantity of supply, this relation would disappear. Thus, $s$ being taken as the grains of sediment per cubic foot of current, Messrs. HUMPHREYS and ABBOTT show that $s$ bears no regular relation to $V$. Whereupon Mr. EADS, multiplying $s$ by $Q$, which is in this case a function of $V$, triumphantly demonstrates that $sQ$ does vary as $Q$ (more or less), and therefore as $V$!

If the quantity of sediment per cubic foot were absolutely uniform at all velocities, then Mr. EADS'S table would show absolutely parallel curves and his demonstration would be perfect. Let us suppose, for instance, that the Mississippi carried a saturated solution. Then $s$ would be per-

fectly independent of $V$; and yet by Mr. EADS's method $sQ$ would vary exactly as $V$—*quod erat demonstrandum!*

In the second part of his essay, Mr. EADS assails the statement that the Mississipp bottom is composed of blue clay, older than alluvion, and exceedingly tenacious. This he declares to be an opinion hastily drawn from insufficient evidence. Aside from his silly attempts to ridicule it, he succeeds in showing that the proofs are not as numerous and conclusive as they might be made by further observations. Unfortunately, his exhibition of conceit and ignorance on elementary questions does not render his challenge of any scientific proposition a weighty one. Before laying down the law on such subjects, he must be elevated to the bench. Just now, as it happens, it is Mr. EADS and his theories that are on trial. He refers to the results of operations at the mouth of the Mississippi, as though they had completely vindicated his judgment, and dumbfoundered his critics. This cool audacity may impress some minds as the sublime confidence of genius and the perfect consciousness of power and knowledge. Those who have watched closely the career of Mr. EADS, while they recognize his enterprise and perseverance, and make allowance for his arrogance of temper, are not ready to accept his sanguine declarations and prophecies in lieu of facts. With regard to his boasted success at South Pass, the cardinal difficulties foreseen by his critics have yet to be encountered; and he would be wise not to make quotations from the history of his triumph before the book has been written. *

The French official reports have been published and give the production of coal in France in 1876, in metric tons:

| | |
|---|---|
| Bituminous coal and anthracite | 16,889,201 |
| Lignite | 465,595 |
| Total tons | 17,104,794 |

## THE RARER METALS AT THE PARIS EXPOSITION.

Written for the Engineering and Mining Journal by Professor Bejamin Silliman.

*Concluded from page* 148.

5. NEW ALLOY FOR SUBSIDIARY COINS, ALUMINIUM-NICKEL.

Messrs. JOHNSON, MATHEY & Co. exhibit a goodly show of brilliant white coins—tokens—of an alloy of aluminium, 98 per cent. and nickel, 2 per cent. This alloy is offered as a substitute for the copper-nickel coins now in use. In color it is almost as white as silver, for which it might easily be mistaken except for its extraordinary lightness. Its weight (only 2·75 density) would at once prevent its being mistaken for silver or any other metal. The head of the Queen on one side, with the legend, "Victoria—Queen," shows how well it is adapted to receive a sharp impression. It would be impossible to counterfeit this coin without the use of aluminium, which is a metal sufficiently scarce and difficult to obtain to discourage frauds of this kind, while it is yet sufficiently abundant to meet the requirements of coinage. It does not tarnish by handling or exposure to the gases which blacken silver and bronze, nor has it any disagreeable odor. It is as hard as silver, but not so hard as German silver (our "nickels"), which is an advantage in the ease and beauty of coinage. Whether it will meet all the requirements of subsidiary coinage, only a practical test in actual use can determine, but its beauty and lightness commend it to a trial. The inconvenience of mistaking it for silver in the night would be avoided by its extreme lightness, which is about one fourth that of any existing coin of like size, and it may easily be made to meet the decimal divisions of the metric units of weight and measure. The show of aluminium in large ingots in the French and English departments was remarkable, but no information was offered as to the price at which this metal was sold. We know, however, that from the nature of the case it can never be a very cheap metal, since it is obtained only by the use of sodium, nearly two pounds of which are required in the production of one pound of aluminium. But on the other hand its low density—about the same as marble—makes it economical, since a large coin of this new alloy weighs much less than any other coin now in use. This leads us to say a word about *nickel*, which just now has come to the front in an unexpected manner.

6. NICKEL—THE NEW CALEDONIAN ORES, A REVOLUTION IN THE PRODUCTION AND METALLURGY OF THIS METAL—JOSEPH WHARTON, OF PHILADELPHIA, WINS THE GOLD MEDAL—REMARKABLE DISPLAY OF NICKEL ORES AND PRODUCTS—NICKEL COINS. PLATINUM COINS—PLATINUM GOLD COUNTERFEITS, ETC.

This metal, which, until quite recently, has been so rare and its metallurgy so difficult that it has borne a very high but variable price, is now found in such abundance in the French penal colony of New Caledonia that the price has undergone a remarkable and probably permanent reduction. The display of this metal and its ores in the Exposition at Paris this year is one of the most remarkable of any of the metals, and the stimulus which has given to nickel this present prominence is the comparatively recent discovery of extensive deposits of an ore of this metal just mentioned in New Caledonia, which, if it is not absolutely a new species in the mineralogical sense, is yet new in its metallurgical relations. Hitherto the only ores of nickel known to the metallurgist have been those associated with sulphur or arsenic, or both, and the metal has been found also in company often with lead, bismuth, copper, iron, and cobalt, offering a very troublesome and expensive problem for its purification. In the United States, the only mine of nickel of any commercial importance is the well-known Gap Mine in Pennsylvania, owned and worked exclusively by Mr. JOSEPH WHARTON, of Philadelphia, whose name is known the world over for his success in this branch of industry, and who has hitherto enjoyed the "protection" of an exclusive duty. It is to the credit of this enterprising and very successful metallurgist that in the present Exhibition at Paris he has led the world in showing the only specimen of *forged nickel*, which is to be seen in the extensive exhibits now on view there; and we violate no confidence in mentioning this circumstance, which, it is understood, secures to Mr. WHARTON the gold medal in this line of industry. The ore from which Mr. W. has obtained his metal is chiefly what the mineralogists know as *nickeliferous pyrrhotine*—a white sulphide of iron, with not over 3 per cent of nickel.

But the new ore of Caledonia is a hydrous silicate of nickel and magnesia, found in serpentine rocks. This ore when pure is of a beautiful apple or pea-green color, resembling the lighter shades of the copper ore known as malachite. It is completely free of all traces of sulphur and arsenic, and, if cobalt is found with it, the amount of this latter metal is extremely small. Over twenty thousand tons of this ore, it is said, have been shipped from New Caledonia to France and England, and of an average value, it is said, of nearly 10 per cent of nickel. The ores of nickel heretofore worked have not yielded an average of over 3 per cent of this metal, and to extract this comparatively small quantity has been many times more costly than is the reduction of so simple a compound as the New Caledonia ore, in which the very troublesome elements of sulphur, arsenic, cobalt, iron, and copper are absent, not to name lead, bismuth, and antimony, which are found in the German nickel ores. We are not surprised, therefore, that the price of nickel of 98 per cent to 99 per cent purity has fallen very greatly in the market, so that at present 3s. or 4s. sterling is named in place of the old price of 12s. to 16s. or over, which it held for a long time. The present may be an abnormally low price, owing to the commercial disaster attending an extravagant and unwise overstocking of the markets of Europe with New Caledonian ores, and it is not believed that it will long remain at so depressed a figure. But we can not fail to remember the effect of the discovery of the tin ores of Australia, which have, as it seems, permanently reduced the price of that important metal to considerably less than one half its former long-established value, and have shut up many of the old mines. Considering the very valuable properties of nickel and the wide range of uses to which it is now applied in the arts, the world at large will not regret that the new sources of this metal seem to promise a supply which will permanently reduce its price and must proportionately extend its use. But we are by no means sure, as yet, that the Caledonian deposits are as permanent as the hopeful owners have represented. The mineral variously called *Garnerite* and *Naumeite*—respectively from the geologist GARNIER, and the chief city of New Caledonia, NAUMEA—is not, properly speaking, a mineral species, but is simply a magnesian silicate, with variable proportions of nickel oxide, which gives its color to the serpentine. In Lancaster County, Pa., a somewhat similar association of nickel is found in serpentine and the chrome iron of that region; and the chrome ore of the Bare Hills, of Maryland, also carries always a small proportion of nickel. This is also true of the chrome ores of New Caledonia. But nothing heretofore discovered is comparable to the richness and beauty of the Caledonian nickel ores. The most conspicuous show of these is seen in two obelisks in the main gallery of the French Department, shown by the Christofle Company of Paris, supporting on their emerald green foundations a profuse display of metallic nickel in grains, and grouped about them all manner of cast, wrought, and rolled nickel, and of its alloys, in various forms; while behind the glass of the case are seen ornaments of lovely pure green mineral wrought into various attractive forms. In an obscure corner of the open grounds near the Porte Tourville in the Colonial Annexe, may be seen a large quantity of the Caledonian ores in huge blocks many hundred pounds in weight, less beautiful to the eye of the average observer than the mosaic obelisks of the Christofle Company, but more interesting to the geologist and metallurgist. Much the same things were shown in Philadelphia among the South Australian exhibits, but attracted little attention. There are at least half a dozen other exhibits of nickel and its alloys, chiefly from the ores of New Caledonia, to be seen among the French metallurgical exhibits, and one from England, that of WIGGIN, a well-known Manchester manufacturer—in addition to which we should remember the very creditable exhibit of Mr. WHARTON in the United States Section, already alluded to. But we have not space to do justice to these exhibits, and probably enough has already been said on this subject to meet the wants of the general reader. I will only add that the recent discoveries of new sources of supply for nickel have quite removed all cause for anxiety as to the adequacy of the mines to meet the demands of the world should this metal come into more general use for subsidiary coinage, to which its properties in many respects particularly adapt it.

Platinum, which the Russians at one time coined in considerable quantity, has been withdrawn, as of too uncertain value. It is a curious fact, worthy to be mentioned in this connection, that a large number of spurious doubloons were uttered by one of the Peninsular governments during the late civil wars, the nucleus of which was a disk, or blank, of platinum, which was inclosed between faces of gold, the blow of the coining-press concealing the fraud, while the weight of these spurious pieces was identical with the genuine coin; the value, however, of the platinum being about one third that of the gold coin it represented. These platinum blanks had been prepared by the Russian government for their use in the suppressed coinage of that metal. This curious case of a debased coinage, which, in the event of a successful issue of the war, was to be withdrawn, is not commonly known, but is vouched for to me by a high authority.

PARIS, August, 1878. B. SILLIMAN.

## CORRESPONDENCE.

### THE FRICTION OF WATER IN PIPES.

LOWELL, August 31, 1878.

EDITOR ENGINEERING AND MINING JOURNAL:

In his communication of June 8th, 1878, page 390, Mr. SWAIN made an erroneous application of the Francis-Darcy formula for friction of water flowing through pipes, which might lead to serious error if similarly applied in another case, although the resulting error in the case there considered by him is comparatively unimportant.

He there attempts to determine the velocity with which water would flow though a pipe 300 feet long, 2 inches in diameter, under a head of 10 feet. To make the error of his application more apparent, let us take the case of a short pipe, say 5·6 feet in length, and of same diameter, and under same head as in his case, and follow his method. DARCY'S formula is (*a*)

$$i = \cdot00371 \frac{(d+1)}{d^2} v^2$$

; $v$ being velocity of water within the pipe in feet per second; $d$, diameter of pipe in inches; $i$, loss of head in feet, per

foot of pipe, from friction of water. This formula he transposes (*b*) $v = \sqrt{\cdot00371 \frac{i\,d^2}{(d+1)}}$. $i$ is in this case $\frac{10}{5{\cdot}6} = 1{\cdot}786$, and the value of $v$ is 25·36, which is just equal to the velocity due the given head. while we have just assumed by his formula (*b*) that the whole head is lost from friction within the pipe. With a pipe of less length than 5·6 feet, $i$, the loss of head per foot of pipe, and the resulting value of $v$ would be greater —that is, the velocity, as determined by his formula (*b*), would be greater than that due the whole head. This result does not disprove the correctness of DARCY'S formula. It arises from the false assumption that the whole head is lost from friction, while some portion of the head must necessarily be utilized in inducing whatever velocity there may be in the pipe. The elementary formula for the velocity of water is (1) $v = \sqrt{2g\,H}$; $g$ being equal to the velocity acquired by a falling body, in a vacuum, at the end of the first second, in feet per second, say 32·1618, and $H$ the head which impresses the velocity. In the case of water flowing through pipes, $H$ is obviously the total measured head $H'$, less the head lost from friction in the pipe, and the losses from bends, contractions, etc.; these losses vary with the square of the velocity or are functions of $v^2$. The formula for the velocity of water flowing through a pipe may be expressed generally (2) $v = \sqrt{2g\,(H' - (f+f'+f'')\,v^2)}$; $f$, $f'$, $f''$ being the co-efficients of $v^2$ to express the various losses, which reduces to (3) $v^2 = \frac{2g\,H'}{1+2g\,(f+f'+f'),}$ and where only one loss, as that from friction in a straight pipe, is considered, (4) $v^2 = \frac{2g\,H'}{1+2g\,f.}$

By Darcy's formula, $f$ is $l \cdot00371 \frac{d+1}{d^2}$, where $l$ is length of pipe in feet, and, placing this value of $f$ in equation (4) we have (5) $v^2 = \frac{2g\,H'}{1+2g\,(l \cdot00371 \frac{d+1}{d^2}}$, which reduces to (6) $v^2 = \frac{2g\,H'\,d^2}{d^2 + \cdot00371\,(d+1)\,2gl}$. Applying this formula to the case above, we get for $v$ a value of 17·93, which is that due a head of 5 feet. And, applying DARCY'S formula, we find, in the case of this pipe and with the velocity 17·93 feet per second, that there will be a loss of head of 5 feet, which is just what remains of the total head to be accounted for. This does not prove the accuracy of DARCY'S formula, but shows that formula (5) gives a consistent value to $v$ in this case, as it will be found to do in any other case. Few cases will be found where it will not be necessary to consider the losses arising from bends, contractions, either at the mouths or within the pipe, or from enlargements. The co-efficients of $v^2$ to express these losses should be put in place of $f'$ $f''$, etc., in equation (3), and the proper reductions made. It is easy to see, therefore, why a computation based on DARCY'S formula alone should not give a value for loss of head as great as the loss is found to be in practice. It may also be seen that the best formula may fail to give satisfactory results if incorrectly applied. NATHANIEL HILL.

## NEW GAS FURNACE AT COUILLET ROLLING MILLS, BELGIUM.*

By M. Tahon.

This is an ordinary reverberatory puddling or heating furnace, slightly modified with the object of getting a good gas furnace, of simple construction, and not expensive to keep in repair. For this purpose the fireplace is made rather longer, and arranged for distilling the gas from the coal; and for completing the combustion of the gas a current of highly-heated air is admitted immediately above the bridge, through a flue built in the body of the roof of the puddling or heating chamber.

The coal from the charging hopper falls upon an inclined dead-plate in front of the grate-bars, where it undergoes gradual distillation by the heat radiated from the small fire and from the highly-heated walls of the furnace. The residual coke is pushed forward upon the fire at intervals by the stoker, the layer of incandescent fuel upon the fire-bars being kept thin enough for allowing a certain portion of air to pass through the fire for the partial combustion of the gas, which consists mainly of carbonic oxide. The perfect combustion is completed by the special current of hot air entering the furnace through a series of small holes from the flue in the roof; a mass of open brickwork inside the flue baffles the air in its passage, and heats it to about 570 degrees Fahr. By means of an external damper the quantity of air admitted through the flue is regulated, so as to give an oxidizing flame during the earlier stage of the puddling process, while in balling up the admission is reduced to the least possible, in order to avoid oxidation and consequent waste of metal. For cleaning the grate when required, provision is made for readily inserting a temporary sliding grid immediately above the fire-bars, to carry the fire while the bars are dropped and replaced.

The result of a fortnight's working of four of these gas furnaces at Couillet, in October, 1877, in comparison with four ordinary puddling furnaces, was a saving of 22 per cent in consumption of coal with 5-cwt. charges of pig, the average consumption in the gas furnaces being 18 cwt. of coal per ton of puddled bar produced; the yield was also slightly increased, and the quality of the iron made was at least equal to that from the ordinary furnaces. In a double gas furnace of similar construction, the consumption was still further reduced to 15½ cwt. of coal per ton of puddled bar, during ten days' working in November, 1877.

It is therefore concluded by M. TAHON, who is the manager of the Couillet Rolling-Mills, that this plan of gas furnace presents the following practical advantages over the ordinary puddling furnaces, which latter can be readily and inexpensively altered to the new system: Economy of fuel of from 22 to 30 per cent; simplicity of construction and repairs; ease of working; good quality of iron produced, without diminution of yield; and, as in the case of the Couillet Works, the means of utilizing for puddling and heating furnaces the partially-caking coal of the district. A. B.

* Abstract of a paper in the *Revue universelle des Mines*, vol. iii., 1878, p. 494. From the Proceedings of the Institution of Civil Engineers of London. Edited by James Forrest, Secretary.

## THE MODE OF COMBUSTION IN THE BLAST-FURNACE HEARTH.*

By Prof. John A. Church, Columbus, Ohio.

It is a well-known fact that under similar conditions a ton of pig-iron can be made from any ore with less fuel when charcoal is used than when coke or anthracite is employed for heating. The cause of this superiority is entirely undiscovered, and no explanation has yet been offered which has won even temporary acceptance. Such as they are, the hypotheses heretofore presented are of two general kinds, and they come from those two divisions of the working force which are so often antagonistic in all professions—the scientific and the practical men.

The theory of the scientific men is drawn from the chemical reactions which are known to go on in the furnace, and it is well expressed in a recent paper by Prof. AKERMANN, of the Stockholm (Sweden) School of Mines. It makes the superiority of charcoal as a fuel in the blast-furnace to depend upon its quick and thorough reduction of carbonic acid. This property belongs to charcoal in virtue of its porous structure. Its cells have a diameter of only one twenty-four hundredth of an inch, and one grain of charcoal has been computed to have a surface of two and four tenths square feet. According to the theory in question, carbonic acid is formed by the first impact of the air upon the fuel; but in charcoal furnaces the acid is immediately reduced to oxide by taking the necessary amount of carbon into combination, and the gas reaches its highest reducing power even in the near vicinity of the tuyeres. Coke, being harder, does not produce so strong a reducing gas in that part of the furnace. Carbonic acid is formed as in the case of charcoal, and remains longer before its reduction to oxide is completed. Anthracite is the most dense fuel known, and resists the attack of the carbonic acid longer than coke. These facts are pointed to by Prof. AKERMANN and other scientific men, not so much as a full explanation of the higher consumption of the two dense fuels in comparison to the porous one, but as the probable source from which such an explanation is to be drawn. Admitting the instantaneous reduction of carbonic acid before the tuyeres, it is still difficult to understand how this can affect the consumption of coal, when all the researches show that the ore is just as completely reduced twenty feet or more above the tuyeres as it is at any point in the furnace. Up to the moment of fusion, it contains a small amount of oxygen, estimated by BELL at one per cent, which is removed in the act of fusion by the deposited carbon with which it is in intimate contact; but with that exception, reduction is completed in the upper half of the stack.

The practical men in the profession seem to be mostly unanimous in thinking that the high consumption of dense fuels has some dependence upon their slower rate of combustion. It is generally admitted that anthracite burns less rapidly than coke or charcoal, and as a certain weight of carbon must be oxidized in each second to maintain the heat required, they say that there must be more of the dense fuel present to make up for the slower combustion of each piece. The relation of slow combustion to increased fuel consumption has not been very clearly stated, perhaps because the fallacy of the logic that connects them is too plain. Slower combustion indicates the necessity, not of more fuel, but of larger hearths, which will contain more pieces, and present more surface of carbon to the air. If the ignition of a fixed quantity of carbon in one second is all that is required, it will not be necessary to increase the fuel in proportion to the ore, but merely to present the physical conditions which are necessary for burning as much carbon of the dense fuel in one second as of the porous fuel. In that case, the *blast* would be constant, but it is well known that anthracite furnaces require much more wind than coke or charcoal stacks.

But the scientific explanation is equally fallacious. It is based upon experiments which can not recommend themselves as a foundation for accurate deduction. I think no one acquainted with blast-furnaces can readily acknowledge that trustworthy gas analyses can be obtained from the center of the crucible or the point where the heat of the furnace is highest. The logic of this theory is also the worst possible.

Combustion gives the most heat and the highest temperature when the product is carbonic acid. Reduction of this acid to oxide is a cooling process, being always accompanied by absorption of heat. Now, if the dense fuel allows the least of this reduction in the crucible, it ought to secure the highest heat there. That is to say, the crucible of the anthracite furnace should be hotter than the crucible of a charcoal furnace, using an equal weight of fuel and with the same ores. But that proposition we know is untrue. Anthracite furnaces use much more coal than charcoal stacks, even when working under conditions which are nearly similar. In the paper on the velocity of gases in the blast-furnace, presented to this Institute at the Dover meeting in May, 1875, I showed the following comparative results of the two furnaces working on Lake Superior ores, one using charcoal and the other anthracite:

| | Elk Rapids Charcoal. | Fletcher. Anthracite. |
|---|---|---|
| Ore, per ton pig; tons | 1·613 | 1·730 |
| Limestone, " | 0·145 | 0·617 |
| Charcoal, " | 0·884 | ..... |
| Anthracite, " | ..... | 1·427 |
| Average yield of ore | 62·0 | 57·8 |
| Average grade of pig | 1.05 | 2·11 |

The Fletcher anthracite furnace, therefore, used 0·117 ton of ore, 0·472 ton of limestone, and 0·543 ton of coal more than the charcoal furnace. The ore used in the anthracite furnace was not so rich by 4·2 per cent as that of its rival; but it also produced a pig metal which was lower by 1 06 numbers. Furthermore, it did not work on anthracite alone, 0·371 ton of its fuel being coke. This addition of coke and reduction in the grade of the product may be assumed, without close calculation, to offset the better quality of ore in the Elk Rapids furnaces so far as the expense of heat *in fusion* alone is concerned. We then have 0·472 ton of limestone and 0·543 ton of fuel more in the anthracite than in the charcoal furnace; and we may confine our calculation to the difference in the burden of limestone. The 0·472 ton of flux contains 56·64 lbs. of carbon, and the fuel will lose a corresponding amount. The heat absorbed in this process will require 87 lbs. of coal, if we assume that the average heat of pro-

* From the *Transactions of the American Institute of Mining Engineers*. Read at the Chattanooga Meeting, May, 1878.

duction is one third the maximum of pure carbon. To expel the carbonic acid, 172 lbs. of coal will be required under the same supposition. These three quantities sum up 316 lbs., or 0·141 ton, and we may look upon the remainder of the difference (0·543—0·141) 0·402 ton, or 900 lbs. of anthracite per ton of pig, as probably representing the nearly inherent difference between the two fuels. There can be little doubt that this difference would be enormously increased if the Elk Rapids furnace with its 1905 cubic feet of capacity were to be fed with anthracite, and driven to make 29·75 tons of pig in twenty-four hours. Or, looking at the subject from another point of view, there can be little doubt that the Fletcher furnace, with its 4193 cubic feet of capacity, would quickly chill throughout, if 900 lbs. of anthracite per ton of pig were subtracted from its charge, and it were still driven to produce 25·27 tons of metal as a constant daily average. It would not have heat enough for its work either in the hearth or anywhere else.

Returning to the two theories which have been spoken of, it will be observed that both of them recognize the fact that the difference between the fuels is confined to their action in the *hearth* of the furnace. Stated in a few words, the explanation of the chemists is, that the charcoal furnace is better because it has a strong reducing gas in the hearth; and the explanation of the practical men is, that the charcoal furnace is better because it has higher temperature in the same region, both propositions being based upon the assumption of equality in weight of fuel, rate of driving, and all other conditions.

In this day, when theory rises upon theory from every point of scientific view, it is with some regret that I feel compelled to reject the explanations mentioned above, and offer one that is every way new. But I think my hearers will agree that the occasion demands it. It is assumed that no theory can be conclusive which does not satisfy the following conditions:

That, for a given weight of fuel, the well of the charcoal furnace is hotter than that of the coke or anthracite furnace.

That more fuel reaches the lower part of an anthracite furnace than of a coke or charcoal furnace.

The explanation offered as sufficient to satisfy these conditions leans more to the time-theory of practical furnace-men than to the carbonic acid reduction theory of the chemists. It depends upon the different igniting powers of the three solid fuels, and it draws the attention away from the fuel in order to fix it upon the behavior of the *air*. I hold that—

*The highest carbon duty is given by the fuel which withdraws the most oxygen from the blast in a given space of time.*

In other words, the carbon duty of a fuel is proportional to its power of combustion in extremely dilute oxygen.

Let us consider what takes place when air is blown forcibly into a mass of incandescent fuel. Air is a mixture of nitrogen and oxygen, and the proportion of the latter is such that it is eagerly absorbed by many substances. One of these is carbon when its temperature is elevated. This igniting power of carbon varies decidedly with the fuel. Charcoal is most easily ignited, a match or a few shavings being sufficient to set it in combustion. Anthracite requires a mass of live coals or the flame of a considerable quantity of wood for its ignition.

It is to be observed that the proportion of oxygen in the air is a very important point. Even with a fuel so easily ignited as a candle, the flame ceases when eight or ten per cent of carbonic acid is present, and candles are extinguished every day in our mines from this cause. We can not attribute this loss of igniting power to the lowering of temperature due to reduction of the carbonic acid by the flame; for even with eight or ten per cent of the impurity, the oxidizing power of the air is still too marked to permit the supposition that such reduction can go on. It is more probable that the carbonic acid acts as an inert substance replacing the same quantity of oxygen, The action is probably one of dilution merely, and we may correctly summarize the facts by saying that, when the oxidizing power of the air has been reduced by removing ten per cent of its oxygen. a candle will no longer give a flame, though its wick continues to glow.

In the blast-furnace hearth, where the heat is intense and the combustible is already incandescent, fuel of any kind is in a condition to take up the atmospheric oxygen quickly, so long as its proportion to the nitrogen is maintained within a certain limit. But if the explanation here advanced is a true one, that limit must be reached within a short distance of the tuyeres. Even a foot or two from the nozzle the gas can no longer be air, but must be a much weaker dilution of oxygen than it was when it entered the hearth. That change in the composition of the blast completely alters the conditions of combustion for the fuel through which it passes subsequently.

Almost any fuel would take up oxygen eagerly from a gas that contained twenty-three per cent of it; but when the proportion is reduced to ten per cent, or to some other limit not yet fixed, the fuel that combines with oxygen most readily begins to assert its superiority.

It withdraws the greatest proportion of the oxygen from the air while the blast is still in the neighborhood of the tuyeres, and this is the reason why a given weight of charcoal makes a hotter crucible than the same weight of carbon in any other form. (This is the first of the requirements given above.) We are not to suppose that charcoal burns as well in an atmosphere containing only ten per cent of oxygen, as in one that has more than twice that proportion. But it seems to burn with much more avidity than coke or anthracite under these conditions, and it is to this power of burning in a weakly oxidizing atmosphere that charcoal owes its immense superiority over all other fuels.

Time is a necessary element in the problem. because, when combined with velocity, it represents a certain path or distance traveled by the air during the time its oxygen is burning the carbon. And that fuel is the best which allows the oxygen the shortest path before it is completely absorbed, because in that case the greatest portion of the path is included in the fuel below the zone of fusion, and more heat is produced below this zone.

Charcoal with its porous structure offers the greatest surface for oxidation, while its great bulk reduces the amount of time, and accordingly of work to be done, in a zone of fusion of given capacity. These are the physical conditions which make it a better abstracter of oxygen from the blast than its competitors.

The state of things is very different in an anthracite furnace. That fuel combines readily enough with the blast so long as it is rich in oxygen; but when a certain limit is reached in the proportion of this element, the combustion becomes very slow, and the last portions of oxygen are carried up into the boshes and consumed there, away from the zone of fusion. This oxygen which is thus carried too far represents a given quantity of carbon which failed to burn in the crucible, but which must be burned there in order to obtain the requisite temperature. To burn it, an increased amount of air must be blown in, and when its oxygen has been reduced from the normal proportion, we have, it is true, obtained the necessary heat in the crucible, but only by loading the furnace with a quantity of unused oxygen which is gradually consumed above the zone of fusion. To provide for this combustion, an increased quantity of fuel has to be charged.

It might be possible to follow this oxygen through the upper zones of the stack and trace its effect upon the operations there. But it is sufficient now to say that the first result would be the addition of heat to the materials just before they entered the zone of fusion, and that this advantage might be entirely neutralized if the gases were left not enough to increase the amount of carbonic acid reduced. In fact, the latter action might more than neutralize the gain obtained by the regenerative action of the materials, and compel the addition of fuel to compensate for the loss. The fact that anthracite furnaces require so much more carbon than charcoal stacks indicates the probability of some action of this kind.

(TO BE CONTINUED.)

## NEW MODE OF DUPLEX TRANSMISSION.*

By O. Morel.

Duplex transmission, based upon the differential system, presents the following inconvenience: if the resistance of one of the differential circuits alters, the current augments in the one and diminishes in the other. Now these two effects combine, and consequently this kind of transmission is more affected than the ordinary transmission by the variations of the resistance of the circuit. The author states that he has sought to remedy the defect in the following manner:

Two relays, the one with a polarized armature, have their coils in circuit with one pole of a local battery and with the line, the polarized relay being next the line. An operating key is connected to the circuit between the two relays. The armature contacts of the relays are connected through a local battery, the poles of which battery are also connected through the coils of the receiving instrument. The contact levers of the two armatures are connected to earth.

From the description it is easy to see that so long as the levers of the two armatures are in connection with their contacts no current will pass through the receiving instrument, and if either of these levers quits this position, the circuit of the local battery will be closed in the receiving instrument. The lever of the operating key, when at rest, communicates with earth; when it is depressed or raised, neither of the relays acts; but in both cases the circuit of the line battery is closed from traversing the bobbin of the unpolarized relay, the armature of which remains always attracted. For the other part, the polarized relay is previously arranged in such a manner that the passage of the current from the line battery does not cause the displacement of its armature.

A station will then be able to transmit without reproducing its signals on its own receiver, and this receiver will nevertheless receive the signals of the station corresponding.

The batteries at the two stations presenting to line poles of the same name, if the operating key at one end is at rest, the current from the opposing station will produce an effect upon the polarized relay inversely to that of the battery at its own end of the line, and its armature is displaced by, and the receiver will reproduce the signals made by, the station corresponding.

If the two stations work simultaneously, the currents emitted annul themselves, and the armature of the unpolarized relay ceasing to be attracted, the receiving instrument will still reproduce the signals sent by the opposing station. The experiments that the author has made with the Morse have been successful, and show that the return current does not produce important perturbations; and, in fact, the polarization of the relay nearest to the line having been over-excited by the passage of the current of the line of battery, the return current has no other effect than re-establishing the magnetism to its normal state. This system does not absolutely necessitate the use of a condenser. Though the different actions of the relays are made in a satisfactory manner with the Morse, they are not produced with sufficient strength to allow of their application to the Hughes receiver. There are, at certain times, delays that can be avoided only by making the relays more sensitive, and in this case the equilibrium is very unstable. The author has also tried the following arrangement: The receiving instrument has a double coil, the one in circuit from the transmitter (mechanically stamped paper) to line, the other in circuit from the transmitter to one pole of a battery, the same pole of which is also connected to the transmitter through a rheostat; the other pole of the battery is connected to earth. The lever of the transmitter, when in repose, is in connection with an earth contact, and the circuit of the battery is closed locally. One part of the current passes by the helix between the battery and the transmitter, the other part by the rheostat, or shunt, also placed between the battery and transmitter. This shunt permits the augmentation or diminution, at will, of the force which keeps the armature attracted. When the lever of the transmitter is raised, the current goes to line by traversing the helix in circuit between the transmitter and line in such a manner that the armature remains attracted. It results, that one is able to transmit without receiving his own transmission. When the two stations transmit simultaneously, currents are annulled and the armature raises itself. When the opposing station alone transmits, its current traverses the helix in circuit between the transmitter and line in an inverse manner to that of the battery at its own end, and the armature is still raised. They will receive, in the two cases, the transmission from the station corresponding; but the return current also releases the armature. P. H.

* Abstract of a paper in *Annales télégraphiques*, 1877, pp. 401 405. From the Proceedings of the Institution of Civil Engineers, edited by James Forrest, Secretary.

## THE LONDON GAS SUPPLY.

Now that the electric light threatens to invade the domain of the gas companies, it is more than usually interesting to make acquaintance with the statistics of the gas manufacture, so as to discover the real cost of producing our usual illuminating agent. No better source of information on this point is to be found than Mr. JOHN FIELD'S annual "Analysis" of the accounts of the London gas companies. The "Analysis" for 1877 has just appeared, and shows that London paid for its gas supply last year no less a sum than £2,704,710, corresponding to an average of 3s. 6¾d. per 1000 cubic feet. Deducting the cost of lighting and repairing the public lamps, the gross amount is reduced by nearly £41,000, and the price per 1000 feet becomes very little more than 3s. 6d. The bulk of this magnificent gas rental falls to the exchequer of the Chartered Company, the amount thus received being £1,782,103, or just about two thirds the total. The gross gas rental of the other companies is as follows: Phœnix, £267,176; Commercial, £211,700; London, £203,034; South Metropolitan, £149,237; and the Surrey Consumers', £91,460. To acquire this rental, the companies expended £1,296,649 for coals. To this may be added £1,044,543 for working expenses, followed by a deduction of £767,821 for residual products, leaving a net outlay of £1,573,371, equal to nearly 2s. 1d. per 1000 feet. This amount is called the "expenditure for gas" on the part of the companies. Deducting from the gross rental the cost of lighting and repairing the public lamps, the net receipts for gas become £2,663,917, and if from this we take the outlay, the balance of £1,090,546 represents the profit on gas, or about 1s. 5¼d. per 1000 feet.

Rather less than 6 per cent of the chartered supply consists of cannel gas, the lighting power of which is 20 candles. No other company now supplies cannel gas, but on the whole there is a proportion of cannel coal carbonized, amounting to 5 per cent of the total quantity. The entire quantity of coal carbonized last year by the London gas companies was 1,614,246 tons, and the average yield of gas was 10,137 cubic feet per ton. Excepting the cannel gas, the lighting power of the gas supplied by the Chartered Company was 16 candles, and the same was the case with the Commercial and the South Metropolitan. These three companies are under the control of the system dating from 1868, and have their gas nightly inspected by the officers appointed by the Metropolitan Board of Works. The London, the Phœnix, and the Surrey Consumers remain as before, and are not subject to any special supervision. The lighting power of their gas appears in the "Analysis" as 12 candles; but this is explained as the "illuminating power required by Act." Probably much of this gas, if tested by the modern standard, would have a lighting power of 14 candles, and some even more. It is certainly an unsatisfactory state of things that the gas supplied to the metropolis should be of so varied a character, and subject to such discordant conditions. Price, quality, and law all differ, making it tolerably evident that somebody suffers injustice somewhere. The South Metropolitan charge is 3s. 2d. per 1000 feet for 16-candle gas, the Commercial 3s. 5d., and the Chartered 3s. 6d. The Surrey Consumers' Company, supplying 12-candle gas of the old standard, perhaps equal to 14 of the new, charges as much as 4s. per 1000. That there should be discrepancies in the rate of charges, might be expected from the inequality in the burden of the capital account. But this fails to explain all the eccentricities of price. The South Metropolitan, which supplies the cheapest gas, shows the greatest economy in the use of its capital, the amount employed being at the rate of 10s. 4d. per 1000 feet of gas. But the capital of the Surrey Consumers' Company is only 12s. 7d. per 1000 ft., while that of the Phœnix is 14s. 7d., and that of the Chartered 16s. 11d. A curious result appears in respect to the amount acquired by the sale of residual products. The revenue thus obtained is a deduction from the cost of coals, and when we take the net cost we find that the charge upon the South Metropolitan for coals is little more than 6½d. per 1000 feet of gas, while it is nearly 8½d. in the case of the Chartered, and more than 11d. for the Commercial. This may bear some relation to the fact that the South Metropolitan uses 3 per cent of cannel coal, the Chartered 6 per cent, and the Commercial as much as 9 per cent. The manufactory charges, taken in the bulk, amount to less than 9½d. per 1000 feet in the South Metropolitan, and to more than 1s. 2d. for the Surrey Consumers. These calculations are made on the basis of the gas sold. There is, of course, less gas sold than made. That which is used at works and offices connected with the companies is readily reckoned up; but there is a proportion unaccounted for. Some of this may be stolen, but still more is simply lost. It is a serious consideration, that of all the gas made, fully 6 per cent vanishes away. The London Company loses 4¼ per cent, the Chartered 6¼ per cent, and the Commercial nearly 8 per cent. The total yearly loss is nearly a thousand millions of cubic feet. Happily we may record that during the last four years there has been an improvement, the loss of Chartered Gas in 1874 being more than 9½ per cent, the London nearly 10 per cent, and the Commercial still higher.

The entire capital of the London gas companies, as shown by the accounts for 1877, is £11,845,749. Of this sum, £1,671,186 consists of loans, the rest being stock and share capital. The companies have power to raise further capital to the amount of £3,717,447, of which £1,679,168 would be on loan. The present capital of the Chartered Company is £8,400,000. The next in magnitude is the Phœnix, with £1,121,000. The idea is prevalent that the capital of the London gas companies is entitled by law to a dividend of 10 per cent, and, as a matter of fact, succeeds in getting that return. In reality, the right to a 10 per cent dividend, if it can be earned, applies to £7,129,740 of capital, the remainder being entitled to dividends ranging between 4 and 7½ per cent. So far as results are concerned, last year realized full dividends for all the companies, with extra dividends in some cases, in consideration of a reduction in the charge to the consumer. These extra dividends are capable of raising the result to more than 10 per cent, but only in consideration of a *pro rata* reduction in the price of gas. These are golden days for gas companies, but perhaps we may not venture to say that the future harvest will be free from blight. The progress of the electric light is somewhat ominous to them, though there is no apparent reason to fear any speedy catastrophe. The effect, however, is felt. Gas shares have been affected by the electric candle, and the local authorities in various places have shrunk from the risk of buying up gas companies. So far as London is specially concerned, we may hope to see the gas supply still further cheapened by the process of amalgamation. The companies have been reduced to about half their former number, and it would possibly be for the public good that all should be merged in one, or at the utmost, two. Economy should be studied in every possible way, for the sake of the shareholders, if not of the public. It is a decided benefit, accruing from the recent inventions in the art of electric illumination, that the gas companies are thereby warned of a possible rival.—*Engineer.*

## THE METALLURGY OF NICKEL.

By M. Badoureau, in Annales des Mines, Translated in Iron.

(*Concluded from page* 115.)

### ASSAY THE DRY WAY.

*The Varallo Method.*—Melt five grams of ore with borax, carbonate of soda, and metallic arsenic. Test the speiss thus obtained in the blow-pipe, making a button with borax. Five assays a day can be made on this plan.

*The Dobsina Method.*—Frequent assays are made at Dobsina of nickel ores and speiss. The weight of sample is 2½ grams, and this weight is marked at 100. The sample is melted with black flux made with 2 parts saltpeter and 5 cream of tartar. The stuff is first pulverized and then roasted in a muffle with 5 or 6 fires, each lasting half an hour. The roasted is conducted in small saucers of refractory brick, 4 centimeters in diameter. The roasting matter is then melted with 50 per cent black flux in fire-brick crucibles shaped like champagne glasses; 60 such crucibles are heated together in a wind furnace measuring $0{\cdot}70^{m} \times 0{\cdot}50^{m}$ and $0{\cdot}30^{m}$ deep. Fusion lasts two hours. A button of speiss with the formula $(Fe,Cu,Ni,Cu)_4As$ is got and weighed. The button is placed in a saucer of fire-brick with a little borax, and heated in a muffle, a slight shaking being given to it to loosen the cinder. The iron, cobalt, nickel, and copper are scorified in succession, the slag presenting a scale of colors ranging from black and blue to brown and bluish green. The operation is frequently interrupted to weigh the button. Among these operations, three are got which correspond as closely as possible to the end of the scorifications of the iron, cobalt, and nickel, respectively. The last gives the weight of the arsenide of copper $Cu_4As$, and by difference we have the weight of the arsenide of nickel $Ni_4As$, and arsenide of cobalt $Co_4As$. Multiplying the three numbers got respectively by $\frac{71{\cdot}3}{100}$, $\frac{61{\cdot}1}{100}$, $\frac{61{\cdot}2}{100}$, we get the weights of the copper, nickel, and cobalt.

### BLOW-PIPE TEST PRACTICED AT SCOPELLO.

The chemist in charge at the Scopello Works is very clever in making quantitative assays of matte with the blow-pipe, operating on a single decigram of pulverized matter. An arsenical flux is used, formed of a mixture of equal volumes of the following matters: Arsenic, potassium cyanide, carbonate of soda, melted borax, finely-pounded charcoal. A leaf of cigarette paper steeped in a concentrated solution of soda, is taken and made into a cartouche. In the lamp is burned a mixture of equal parts of spirit of wine at 95 per cent, and rectified turpentine. If the sample is rich in sulphur or copper, it is first of all roasted in a charcoal crucible. To make this little charcoal crucible a piece of pine wood is cut into parallelopipeda $0{\cdot}15^{m}$ long, with a section of $0{\cdot}02^{m} \times 0{\cdot}05^{m}$, little hemispherical cavities being cut in them $0^{m}{\cdot}02$ in diameter. The sample to be roasted is placed in this little crucible, and subjected to a gentle heat, being from time to time crushed and turned over.

*First Operation.*—Of the raw or roasted powder two volumes are mixed with three volumes of arsenical flux, and the whole placed in the paper cartouche. The latter is closed, and with it is wiped the agate mortar in which the powder and the flux have been mixed. The cartouche is then placed in a little charcoal crucible prepared as above described. Holding the charcoal in pincers in the left hand, and the blow-pipe in the right hand, the point of the inner flame of the blow-pipe is directed upon the paper cartouche. The paper burns, the mass melts, the charcoal and potassium cyanide reduce the nickel, which at first appears in the form of a metallic sponge in the midst of the mass. The nickel then mixes with the arsenic and gives a speiss which is concentrated in the form of a small button, the operation taking a minute and a half. The mass is left to cool for an instant, and the button speiss is seized before the borax is solidified. It is dipped in water and looked at under a lens. If the speiss is free from copper, the button is round, but, if it contains copper, the button has facets like a crystal of granite.

*Second Operation.*—The button of speiss is placed with borax in a second charcoal crucible, and the outer flame of the blow-pipe is directed on the middle of it. The iron is burnt, the arsenic is partly volatilized as arsenious acid and partly remains behind in the slag as arseniate of iron. So long as there is iron in the button it smokes, and is covered with a brownish crust of ferruginous slag. When the operation is thought to be over, the button is taken as before and weighed. For the sake of verification, the speiss is remelted with borax; the borax ought to remain white and the button ought not to lose weight. Theoretically the speiss formed ought to have the formula $M_4As$, which corresponds to 61·7 per cent nickel and cobalt. In practice, however, a little cobalt is lost, but a small excess of arsenic remains. Experience shows that to get at the proportion of nickel and cobalt, 60 per cent of the weight of the button has to be taken.

The button of speiss is weighed with a little steelyard, the weight running on which is a decigram, the arm carrying a graduation which gives the direct percentage of the assayed matter in nickel and cobalt. An attempt has been made to replace weighing the speiss by measuring the diameter of the button, a measure being used which carries two lines meeting at an angle. The measure is graduated so as to give at each point of separation the weight and percentage of the button.

This assay only lasts a quarter of an hour, and gives the percentage in nickel and cobalt to a half per cent, provided the operator is well practiced. By its means the course of operations in the furnace can be followed from point to point, and their working regulated in accordance with the results obtained.

REDUCTION OF IRON-WORKERS' WAGES IN SCOTLAND.—GLASGOW, August 30.—The ironmasters of West Scotland have agreed to inform their hands of a reduction of ten per centum in their wages.

## COMPRESSED-AIR LOCOMOTIVES FOR MINES.

A correspondent of the Glasgow *Herald*, who was much struck, on visiting the Pensher Colliery, Durham, with the excellencies of a compressed-air locomotive he saw there at work, published his impression on August 3d. Having said that the engine is simple, and does its work noiselessly and well, and that he believes those engaged in mining operations have not devoted sufficient attention to its merits, he proceeds as follows: "The locomotive has an iron frame-work about 6 feet long, upon which is an iron reservoir, 2 feet diameter, and containing 20 cubic feet of air at a pressure of 200 lbs. upon the square inch. This air supplies 2 small cylinders, 4 inches diameter, 8-inch stroke, placed underneath, and working with cranked axles, 15-inch wheels. The four wheels are coupled together, gauge 30 inches. There is no link motion, but only two single loose eccentrics of the ordinary kind attached direct to the slide-valve, so that if it is desired to reverse the engine the whole machine is pushed backward until the eccentrics get into the proper position. The air is cut off at one fourth, and it works from 200 lbs. on the square inch down to 80 lbs. The whole machine weighs 14 cwt., and costs from £50 to £60. It draws from 2 to 3 tons of coal along a level road at a speed of from six to eight miles an hour, and is completely under command. It works on roads rising 1 in 15, but it is not desirable to put it on any steeper gradient. The boy who works it sits on the back end, and has only the throttle-valve to mind, and he can drive it round an ordinary turn either with a race or with a single tub, the object being to supersede horses both by collecting single tubs at the face and by trains on the main ways. The steam-engine which compresses the air is an ordinary coupled cylinder engine, with an air-cylinder behind each steam-cylinder, one pump compresses the air to 50 lbs. on the square inch, and discharges it into the other, which compresses into the desired pressure of 200 lbs. From the pumps the compressed air is carried down the shaft in pipes, and carried along the main level, and at suitable points there are taps where the reservoirs can be charged, the connection being made with a piece of India-rubber tube and a brass coupling, the same as attached to an ordinary water hose. The time taken to recharge is about 20 seconds, and the reservoir supplies air for a run in and back. Should it require refilling unexpectedly, the boy shoves back to the nearest tap and fills it without any bother. By means of good workmanship and careful testing of materials, the joints are kept tight, and, practically, there is no trouble on this head. Upon the whole, no practical difficulties have shown themselves, and, as I have said, the machines are doing their work noiselessly and effectively, and there seems to be no reason why they should not. It is true compressed air must be expensive, but then there is no fireman, no dust, no expensive machinery, nothing to go wrong, and no danger of explosion, for the pressure can never be higher after the engine starts. From what I have seen of this invention, I am of opinion that it will be of great use in mine haulage. I am also of opinion that it would be most suitable for our tramways in town."—*Iron.*

## NEW PATENTS.

The following is a list of the new inventions relating to Iron, Coal, Mining Machinery, Chemical Apparatus, and the treating of Precious Metals, etc., from *The Official Gazette of the United States Patent Office* for the weeks ending June 25th, and July 2d and 9th:

*June 25th.*

| *No. of Patent.* | *Title of Invention.* | *Name of Inventor* | *Residence.* |
|---|---|---|---|
| 205,187 | Process of Refining Retorted Amalgam | Frederic Gutzkow | San Francisco, Cal. |
| 205,215 | Amalgamators | Eli F. Russell | San Francisco, Cal. |
| 205,274 | Blast Furnaces | Daniel N. Jones (a) | Johnstown, Pa. |
| 205,282 | Apparatus for Combustion of Fuel for Generation of Steam | Obadiah Marland | Boston, Mass. |
| 205,303 | Electric Lightning Systems | William E. Sawyer | New York, N. Y. |
| 205,351 | Treating Cast-Steel Ingots | Bernard E. Cammell | Sheffield, Eng. |
| 205,354 | Weighing Scales | Henry S. Cochran | Philadelphia, Pa. |
| 205,360 | Steam-Engines | John B. Crawley | Brooklyn, N. Y. |
| 205,428 | Feeding Fuel to Furnaces | August L. Schultz (b) | Dresden, Saxony. |

*July 2d.*

| | | | |
|---|---|---|---|
| 205,525 | Ore Separators | Smith W. Bullock (c) | Newark, N. J. |
| 205,616 | Manufacture of Hydraulic Cement | Uriah Cummings | Buffalo, N. Y. |
| 205,692 | Melting and Refining Iron, and Furnaces therefor | William Sleicher, Jr. | Troy, N. Y. |
| 205,710 | Governors for Steam-Engines | Geo. Westinghouse, Jr. (d) | Pittsburg, Pa. |

*July 9th.*

| | | | |
|---|---|---|---|
| 205,742 | Telescope Attachments for Surveyors' Compasses | William Gurley | Troy, N. Y. |
| 205,744 | Tuyeres | John M. Hartman (e) | Philadelphia, Pa. |
| 205,747 | Blow-Pipes | John S. Hull | Cincinnati, O. |
| 205,750 | Comminuted Asphalt for Roofing, etc. | H. W. Johns | New York, N. Y. |
| 205,756 | Chemical Fire-Engines | William Morrison | Toronto, Canada. |
| 205,759 | Valve-Gears for Engines | Ferris Ogden (f) | Mansfield, O. |
| 205,760 | Processes of Producing and Maintaining a High Degree of Heat by Hydrocarbon Vapor Blast on Heated Metallic Salt Sponge, and Modes of Preparing the Heating Case | Moses G. Parker | Lowell, Mass. |
| 205,764 | Manufacture of Wire | William L. Reynolds | St. Louis, Mo. |
| 205,765 | Steam-Boilers | Julius G. Schmidt | Berlin, Prussia. |
| 205,779 | Hydraulic Connections for a Series of Wells or Cisterns | William E. Worthen | New York, N. Y. |
| 205,793 | Condensers for Steam-Engines | John H. Gable | Shamokin, Pa. |
| 205,799 | Truss Bridges | William Irelan | Oak Springs, Iowa. |
| 205,804 | Packing for Oil-Well Casings | John Q. Miller | Emlenton, Pa. |
| 205,849 | Smoke-Preventing Furnaces | William M. Fisher | Cincinnati, O. |
| 205,868 | Rotary Steam-Engines | William Huston (g) | Wilmington, Del. |
| 205,895 | Hydraulic Elevators | Charles R. Otis | Yonkers, N. Y. |
| 205,901 | Rock Drills | Charles D. Pierce | Philadelphia, Pa. |
| 205,933 | Piston Water-Meters | Parker Wells | Lynn, Mass. |

(a) Assignor of ½ his right to Cambria Iron Co.
(b) Assignor to Bernhard Röber, Dresden, Saxony.
(c) Assignor to Daniel Barnum, Brooklyn, N. Y.
(d) Assignor 4-10 his right to Ralph Bagley, H. H. Westinghouse, T. W. Welsh, J. Caldwell, and S. H. Sprague, same place.
(e) Assignor to Taws & Hartman, same place.
(f) Assignor to the Aultman & Taylor Co., same place.
(g) Assignor ¼ their right to William G. Pennypacker, same place.

A RICH DEPOSIT OF COAL has been discovered at Chala Alta, near Olazco, in Peru. The quantity is calculated as sufficient for the entire wants of South America for a long time.

## "RUBY CAMP," HARDSCRABBLE DISTRICT, COLO.

Special Correspondence of the Engineering and Mining Journal.

Whenever new mineral discoveries are being made, people rush, become excited, and generally overdo the thing. The most extravagant rumors concerning such mining events circulate near and far, are enlarged upon as they travel in a geometric ratio. Thus it happens generally that the investing people are loath to credit any reports which come floating along upon the eastern-going tide of new and valuable discoveries. An occasional report of new gold, silver, or carbonate fields is read, but, as a general condition, is shoved aside with the well-known symbolic expression of disgust. This is all wrong; it ought not be; for a careful business man should not only read what is reported of new mineral fields, discoveries, or strikes, but should investigate whether there is merit in the case. Looking things up will not hurt any body's pocket, but obstinately refusing to read of such things may lose a good opportunity for investment. Such, in several instances, I have observed right here in the Hardscrabble Mineral District. Our mineral region has never been advertised. No elaborate reports of our mines have ever appeared in print except where one or two men of doubtful repute ventured to misrepresent them in one of your contemporaries. But that soon stopped, for the fallacy of their statements soon became transparent. In entering upon my duties as the correspondent of the ENGINEERING AND MINING JOURNAL I shall endeavor, in accordance with your instructions and as becomes the best mining paper in the world, to give nothing but facts. The Hardscrabble Mining District comprises about three townships which can be called mineral-bearing, though its actual boundaries comprise all of Custer County, or about 800 square miles. The precious metals here are found in trachyte dikes or belts; the granite does not bear *paying* ores, except in one or two cases of galena and copper discoveries. Our older mines are veins in trachyte, with barytes gangue. A few quartz discoveries date back to 1873, but have not been much developed since the Pocahontas discovery of chlorides in barytes, with sulphides and (Fahlerz) gray copper following, was made. All these discoveries have been pretty good in the surface workings, but few—I think only the Pocahontas, Humboldt, Leviathan, and Leavenworth—have stood the test below the second levels. With the discovery of BASSICK'S great chimney of agatized quartz, carrying (Au) ($Cl_2Ag$) and (AgS) in chalcedony, magnesian lime, with manganese,* a new era of mining has dawned. The honeycombed quartzite was picked up, the least little sign of it followed, and wherever hornblende was found prospecting began. This has led to the discovery of a vast field of agatized quartz with hornblende, carrying manganese and horn-silver. A belt of impregnated matter of about one and a half miles wide, and over three miles in length, so far, is now the new and most sought-for field with the prospectors of this region. No developments are yet sufficiently advanced to form an approximate idea of what this new chloride-silver belt will bring. Assays of from 6 ounces up to 8000 ounces per ton have been had and show that there is a great body of horn-silver in existence. The new camp has been named "Ruby Camp." It was first discovered by my little son and chain-carrier, WILLY, 13 years old, while assisting me in making the location survey of the "Jolly Cobbler" lode claim. I have also found amethyst stones, and almost every prospect-hole shows the chalcedony. The agatized quartz, when broken, shows extensive and seemingly inexhaustible impregnation of ($Cl_2Ag$). Here is a new and inviting field for investors.

"HARDSCRABBLE."

## ON THE MANUFACTURE OF BRIQUETTES (PATENT FUEL) IN THE AACHEN DISTRICT.†

By Hr. Hilt.

Briquettes can only be manufactured successfully, from a commercial point of view, in districts where the value of the small coal is about one fourth that of the large or lump coal, and where the former as dust is unsuitable for fuel. The binding mediums used for making briquettes may be classified as mineral or vegetable, etc., while the latter include starch, pitch, and coal tar (*sic*). When mineral agents are employed, the result is generally unsatisfactory, combustion being imperfect, and the briquette readily affected by moisture; also they do not possess sufficient cohesion to resist the wear and tear of transport. Notwithstanding these drawbacks they are extensively used in the district of manufacture, but for household purposes only. Those made with the aid of vegetable substances, especially tar, though higher in price, are far superior, being good steam producers, and when made of small size, and the firing is carefully attended to, there is but little smoke given off.

The process of manufacture is as follows: After mixing the coal dust with certain proportions of tar, or other cementing medium, in a suitable mill, hot air or steam is forced through the compost until the tar, etc., is melted; the mixture is then pressed either into rectangular molds or through tubes. From 60 to 74 tons (60,000 to 75,000 kilograms) are made every ten hours. At Kolscheid, near Aachen, at the present time, there is a factory which turns out 100 tons of briquettes daily, which quantity, if necessary, could readily be increased to 200 tons. Anthracite, bituminous, and gas (cannel) coal are used.

COST OF PRODUCTION.

*Per* 2204 *lbs.* (1000 *kilos.*)

| | s. | d. | | s. | d. | |
|---|---|---|---|---|---|---|
| Tar | 2 | 6 | to | 4 | 0 | (2·5 to 4·0 marks) |
| Manufacture | 1 | 2½ | to | 1 | 7½ | (1·2 to 1·6 " ) |
| Interest on plant, etc | 0 | 7½ | to | 0 | 9½ | (0·6 to 0·8 " ) |
| | 4 | 4 | to | 6 | 5 | (4·3 to 6·4 marks) |

The above sum is exclusive of value of coal dust, which, as before stated, should not exceed one fourth the value of the lump coal. D. G.

* This curious deposit was described and illustrated in the ENGINEERING AND MINING JOURNAL of June 22d, 1878.

† Abstract of a paper in the *Wochenschrift des Vereines Deutscher Ingenieure*, No. 2, p. 9. From the Proceedings of the Institution of Civil Engineers of London, edited by James Forrest, Secretary.

## NEVADA MINES.

Special Correspondence of the Engineering and Mining Journal.

RENO, August 28, 1878.

At the Julia they reported on the 27th August, in cross-cut 1 on the 2000 level, an ore-body touched, and reports came of a big deal in Julia and very rich ore found. But to-day's quotation is off again to 9 and a fraction. Sierra Nevada is the conundrum of every one. Many think it is a fight for the possession of this mine and Utah, but the fact that the annual meeting of the Sierra Nevada only takes place the third Wednesday in January, 1879, and Utah meeting July 14th, 1879, lets me put no faith in this report. I think it a simple fight between the bulls and the bears to come; for ten days ago I was told by a Virginia City man, who is in the confidence of many of the leading men, that the Sierra was a good buy. He told me then, "They'll run it to $75 surely." I placed little reliance on it at the time, expecting the final rise only about December, as they have to sink a three-compartment winze from the 1700 down to 2100 and run from the bottom of the winze to the incline, 600 feet of level, before they can open up any ore-bodies in proper shape. I don't know of any thing, and the public does not, warranting any such extravagant price as to-day's quotation, 78. I think the stock largely overquoted, and have my grave doubts about actual ore-bodies found of paying quality and any quantity. Stringers or feeders with good assays have probably been met in the incline, as far as I can learn.

Reports from Bodie continue very glowing. D. C. Norton has been appointed Superintendent of the South Standard mine. The company has a 200-foot-deep shaft at the south end of their claim, which has just been retimbered. Hoisting works are to be erected here immediately, the machinery being already on the ground. Mr. Norton proposes to sink immediately a single compartment shaft at the north end of the claim, which is within less than 50 feet of the Bodie bonanza, to which level it is proposed to hurry the shaft, when the other compartments can be followed down.

*Pyramid Camp*, 33 miles northerly of Reno, Nev.

*The Jones & Kinkead Mine*, in which the 330-foot level disclosed an ore body holding 200 tons of ore, which milled $47, is now only worked by six men. The company has let a contract (on the 26th inst.) to run a 1000-foot-long tunnel, at a point about 600 feet northwest of shaft, to cut the ledge at a depth of 540 feet, or 140 feet below the present lowest level, and near the middle of claim, shaft being at southeast end of location. They are now at water-level. It seems strange they should run so long a tunnel for so little additional depth in the mine; besides, they only run two men in the tunnel. That's good for a twelve months' job. Slowcoach mining. Money seems scarce.

*The Crown Prince*, adjoining the Jones and Kinkead claim, tunnel for their ledge. Tunnel on August 27th, 110 feet. Four men are working. Progress, 4 feet in six hours. Cut a ledge unexpectedly, on the 25th, of very base, low-grade ore.

*The Segregated Monarch* has secured $40,000 of Boston capital, to be expended on it, to test the ledge.

*Real del Monte*, Aurora District, is reported to have struck good ore.

*South Standard Co., Bodie, Cal.*, has commenced its shaft. It is being sunk just at the Bodie line. The men are working in six-hour shifts.

C.

## ON VENTILATING SHAFTS IN COAL STORES.*

By H. Henning.

Messrs. ABEL and PERCY, in the report upon ventilation and spontaneous combustion in coal,† held that ventilation on board ship was impossible, and that in stores ventilating shafts were not only useless, but dangerous. The following facts seem to point to a different conclusion.

The author had to erect (at Dantzic) a coal-shed of considerable size. On two previous occasions extensive fires occurred in which 1000 tons of Silesian coal, and in another instance 2800 tons of English coal, were partly reduced to coke and partly consumed. Observations made at the time showed that the heated air could leap over distances of 10, 20, and 25 feet without any perceptible cause. These facts induced the author to introduce ventilating shafts in the new sheds, in spite of the various opinions against their application. Two thousand tons of very damp English coal were put into the new shed. The ventilating shafts in the absence of any data as to their distance, were placed at random, 25 feet apart in one direction and 12 feet in the other, and communicated at the bottom with underground channels.

The amount of moisture in the coal was about 2½ per cent; and about a fortnight later the whole shed was filled with steam, and the air in the ventilators had risen to 95° and 113° Fahr. The shafts were provided with valves, so as either to admit or exclude the external air. These were immediately opened, upon which there was so rapid an evolution of steam, that the next day the evaporation had nearly ceased, and after eight days no more vapor was visible. The coals were then removed, and it was found, that in the direction of the 12-foot distance they were perfectly cold, while in the 25-foot direction the middle portion was warm for a length of about 12½ feet. This was a clear proof that the distance of 25 feet was too great. The height to which the coal was stored was 20 feet.

From these facts the author concludes that ventilating shafts, placed at distances equal to one half the height to which the coal is stacked, will under all circumstances have a good effect; and if a thermometer is inserted into the air shafts, a sure test of the condition of the coal is constantly at hand.

J. G. H.

* Abstract of a paper in *Journal für Gasbeleuchtung*, vol. xx., pp. 518-20. From the Proceedings of the Institution of Civil Engineers, edited by James Forrest, Secretary.

† "It does not appear practicable, therefore, to apply ventilation with any prospect of guarding against the accumulation of heat in some portion of a cargo of coal. Indeed, a period would be reached when the development of heat would be most seriously promoted by ventilation, some time before actual ignition demanded the total exclusion of fresh air."—Paper by F. A. Abel, Esq., F.R.S., and J. Percy, Esq., M.D., F.R.S., in the Report on the Spontaneous Combustion of Coal in Ships, 1876, p. xxvi.

## HOW TO LIVE AND MAKE A FORTUNE IN THE SAN JUAN (COLO.) SILVER MINES.

Special Correspondence of the Engineering and Mining Journal.

In my last letter I promised to give a sketch of our winter's work in Imogene Basin, Sneffles District, but since then have decided that it were better to give an idea of how two men can put in *next* winter's work; for since last, *tempora mutantur et nos mutamur in illis;* supplies are cheaper, the railway 100 miles nearer, roads and trails improved and extended, the demand for ore by the fifteen reduction works which we now have largely in excess of the supply, two new smelters at Ouray nearly completed and now paying cash for ores—all this has given a tremendous impetus to production, and nearly all here who own prospects are making strenuous efforts to raise a "grub-stake" in order to work them all winter, while the mines already in pay are being worked to the utmost capacity of the owners.

The "stake and pencil" miner has departed from among us, and everywhere you will see the monuments of his enterprise and imbecility: Stakes claiming "this mineral-bearing lode" stuck on little seams of mineral in country rock, pockets of mineral in "blow-outs," holes dug in "slide-rock," not to forget one I saw on a big deposit of black obsidian, specimens of which the noble owner had taken to New York to sell as *coal*.

But the workers are all here, and this fall sees the San Juan country starting on the solid basis of men of muscle, grit, and staying qualities to work her mines, and, what is of equal importance, a ready market for the output. Every day, too, a report comes from some mine that is being steadily worked, of enormous increase in the richness of the mineral as depth is gained.

### SOMETHING RICH.

*The Hidden Treasure*, of which I wrote you last, has now two feet of perfectly solid ore, which runs 280 ounces across the pay streak, as I made a carefully-sampled assay of it. The crevice is now but little more than three feet wide, the clay gouge being about a foot wide, which they pick out and then throw the ore with a shot behind it, the two owners taking out over a ton per diem. One shot yesterday threw upward of a ton of ore in huge blocks, one of which, nearly solid gray copper, took three men to lift. The breast of the tunnel is really a beautiful sight, with its two feet of solid glittering mineral, and not a pound of gangue in it, bordered next the gouge with a two-inch streak of white crystalline quartz, full of rich yellow chalcopyrite. The drift is on the vein, and by simply driving ahead, as it stands to-day, three eight-hour shifts could take out over $2000 cash per week, and this, be it remembered, dead-work. Depth now not over 100 feet. These are actual facts, and I am speaking rather under than over the mark. The mine being not over fifteen minutes' walk from my cabin, I am enabled to make correct observations at leisure. There are good sites for four more levels on the claim, and a little penciling will give you an interesting idea of what a bonanza it is, as the same body of ore shows up 750 feet above their present workings.

And now regarding an outfit for nine months' work here—October to June, inclusive. Two men will require staples as follows, and any one can easily ascertain prices at Alamosa, the present terminus of the Denver and Rio Grande Railway. Add to that 4 cents per pound for freight, at which rate I can have the goods laid down at my cabin door: Flour is now quoted at $2.75 per 100 lbs.; bacon, 9¾c.; sugar, 10¼c.; dried apples, 10c.; Salt Lake peaches, 12½c.; best tea, $1 per lb.; coffee, 19 to 24c., Rio; 26 to 30c., Java; 30 to 36c., Mocha; oat-meal, 6½c.; rice, 11c.; currants, 11c.; butter, 25 to 30c.; beef, which we intend to have driven up and killed here, about 6½c.; potatoes, about 3c. per pound in Ouray.

For two men, nine months: Bacon, 150 lbs.; flour, 800; sugar, 200; dried fruits, 100; tea, 10; coffee, 25; oat-meal, 50; corn-meal, 100; rice, 20; potatoes, 400; turnips, 200; onions, 50; soap, 16; beef, 600; candles, 40; New Orleans molasses, butter, condensed milk, etc., *ad lib.;* 12 kegs powder, 2000 feet fuse, 3 sets of drills; $100 will pay for powder, fuse, steel, hammers, picks, and shovels. Your log cabin costs you nothing but elbow-grease; and if you are good friends with the neighboring miners, some of them will always be on hand at your "raising bee." Your cooking utensils cost, say $5, bedding $20; and there you are. We cook in an open fire-place, but $30 will buy a neat little cooking-stove, with all the paraphernalia, and this in two months' time will pay for itself in the saving of time and labor cutting wood. Merchants at Ouray, 8 miles distant, and Silverton, 18 miles, are outfitting our miners now at Alamosa prices, freight added. Packing from Silverton here costs 1 cent per pound; from Ouray, about ½ cent. Of course a man can add to the above any luxuries his purse will warrant in the way of canned meats and fruits, etc., and having got all in by the end of September, and his cabin built at the mouth of his tunnel, all he has to do is to "wade in," and drive ahead, and, providing he be intelligent and industrious, and observes the ancient Delphic precept, "Not too much of any thing," he will have good health and spirits, a jolly winter, and, mayhap, $10,000 worth of ore on the dump in the spring.

A gentleman, who is a mine-owner in Spain, writing to me from London, says: "What I feel I can not fully realize is the effect of this awfully snowy climate of yours, this monstrous difficulty of working at such altitudes, and the getting up there the necessary materials for carrying on works—even the necessary stoves to keep in life; and you, I think, although on the spot, appear to no more realize the position than I do." I confess I do realize no difficulty whatever, it's as "easy as rolling off a log." Buy your supplies, and pay for them; hire a pack train, and they will be laid down at your cabin door. You can get all the miners you want at $3 per diem and found, and you can get cash for your ore. Please point me out a difficulty, somebody. As to getting machinery in to our doors, I grant you there is a difficulty, and that is the want of a wagon-road from Ouray, but it can be built for $8000 or $10,000, and in itself would be a paying investment. But we don't want any heavy machinery up here. Ours are magnificent concentrating ores, and "one-horse" concentrators at the foot of our dumps are what we want, and they can be put up here easily. We can then afford to ship our concentrated 40 and 50-ounce ores to the neighboring works, and make a fortune at it too.

But trying to get capital in England to develop mines here is some-

what analogous to the story of the man who made a wager that he would stand on London Bridge with a tray of genuine gold sovereigns and offer them for sale for a penny each. He did it, and not a soul would buy one.

I send you a schedule of prices paid for ores at the smelting works in Silverton, by which you will see that for ore assaying 200 ounces of silver per ton of 2000 lbs., they pay 70 cents per ounce, *i. e.*, charges, $60 for milling, and, silver being now at $1.15, makes $30 more = $90 per ton. Our smelters at Ouray have not issued schedules yet, but when they do, I will send one, but I think the above will show that there is a *very fair* margin for the smelter as well as the miner. The price paid for 50-ounce ore—$5 per ton—will show how badly we need concentrators:

PRICES PAID FOR ORES AT SILVERTON SMELTING WORKS.

GOLD ORES.

When delivered in 1-ton lots, or upward, will be paid for at the rate of ninety per cent of the currency value of the gold and silver contents, after deducting fifty dollars per ton for working and converting.

Ores in which the value of the gold exceeds the value of the silver are classed as gold ores.

Silver ores containing gold in excess of one half ounce per ton, an allowance will be made for the gold, based upon its equivalent value in silver.

No charge will be made for crushing, sampling, and assaying ores purchased by this company, when delivered in lots of 1000 pounds and upward.

SILVER ORES.

*For ores assaying per ton of 2000 pounds.*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | oz. up to | 50 | oz., | 10 | cents per ounce. | 180 | oz. up to | 190 | oz., | 66 | cents per ounce. |
| 50 | " | 60 | " | 15 | " " | 190 | " | 200 | " | 67 | " " |
| 60 | " | 70 | " | 22 | " " | 200 | " | 225 | " | 70 | " " |
| 70 | " | 80 | " | 29 | " " | 225 | " | 250 | " | 74 | " " |
| 80 | " | 90 | " | 36 | " " | 250 | " | 300 | " | 78 | " " |
| 90 | " | 100 | " | 42 | " " | 300 | " | 350 | " | 80 | " " |
| 100 | " | 110 | " | 48 | " " | 350 | " | 400 | " | 82 | " " |
| 110 | " | 120 | " | 52 | " " | 400 | " | 450 | " | 84 | " " |
| 120 | " | 130 | " | 55 | " " | 450 | " | 500 | " | 85 | " " |
| 130 | " | 140 | " | 57 | " " | 500 | " | 660 | " | 86 | " " |
| 140 | " | 150 | " | 60 | " " | 600 | " | 700 | " | 88 | " " |
| 150 | " | 160 | " | 62 | " " | 700 | " | 800 | " | 90 | " " |
| 160 | " | 170 | " | 64 | " " | 800 | " | 900 | " | 92 | " " |
| 170 | " | 180 | " | 65 | " " | 900 | " | 1000 | " | 94 | " " |

Special rates for ore above 1000 ounces.

W.

## GEORGIA GOLD MINES.

Special Correspondence of the Engineering and Mining Journal.

Gold has been mined here ever since 1830, when the first rush was made. This was a Cherokee reservation, and it was not until 1837 that the Indians were moved west. Placer-mining has been carried on steadily ever since wherever water was obtainable, and even in some places where the dirt had to be carried down to the water. It may be inferred from this that all the rich placer deposits are by this time exhausted, and, as a matter of fact, those miners who are still engaged in washing the banks of the streams and the hollows do not make more than from 75 cents to $1.25 a day as an average.

These miners pay to the owners of the land a rent of from $\frac{1}{8}$ to $\frac{1}{10}$ of the amount of gold they take out, varying with the nature of the deposit and the difficulty of working. In one case the rental is $\frac{1}{4}$, but the water used is supplied to the mines from a ditch.

There are four chief water ditches in this county, which will prove of great value in developing many properties hitherto unworked. The chief of these is the Hand ditch. At the town of Dahlonega it branches into three parts; the first to operate the Hand and the Benning Companies' mines, the second goes to the Findley property, and the third to the Pigeon Roost property. By the terms of their charter, as interpreted in the Supreme Court of the State, they are bound to furnish water to all applicants at a reasonable rate. This rate is 12½ cents per inch for all taken above the Hand mill, and 10 cents for all taken below. The inch used is the square inch orifice with 6-inch head at low water.

The Pigeon Roost Branch was built by a special agreement between Colonel BARLOW, the owner of the property, and the Hand Company. By this agreement the two parties share the expense of constructing the ditch equally, and share the profits of the mine, as long as it is worked above the water level. After that, the property reverts entirely to Colonel BARLOW and the ditch to the Hand Company.

In a recent issue I notice an article entitled "Gold Mining in Georgia," in which there are several errors which I will endeavor to correct. The grade of the ditch is 1¼ inches per 100 feet, or 5½ feet to the mile. It formerly ran over trestle-work when necessary, but now all the trestle-work, with a single exception, is replaced by piping; that exception is only 880 feet in length.

On the main ditch there is only one length of iron pipe of 230 feet. There are six lengths of wooden pipe, aggregating 1 mile 2290 feet in length, one of the sections being within 10 feet of a mile in length. This wooden pipe is made in two layers, breaking joints, and encircled by stout iron bands. It is much cheaper than iron and quite durable.

On the Pigeon Roost Branch there is a tube 2300 feet in length, of which the lower 1900 feet are of iron. The upper 200 feet of each end, which represents a head of 30 feet of water, is made of wooden tubing. There are three other sections of wooden tubing, aggregating 1440 feet.

The Hand Company only owns the Hand Mill; the Findley, Benning, and Lawrence mills are owned by different companies. Your correspondent's mistake probably arose from the fact that Colonel HAND is interested in all these properties.

The ore in these properties now being worked, *i. e.*, all except the Lawrence, is carried down to the front of the batteries by water. The soft slate and fine dirt is carried through into the river beyond. The rocks which are deposited on the mill floor act as riffles and prevent loss of gold by the rush of water which might be expected. To test this question, Mr. HALL, of the company, passed the waste water through a long train of sluice boxes with pole and rock riffles. Quicksilver was employed. After running for some months, on cleaning up, only 10 pennyweights of gold, was obtained, which was not sufficient to pay for the expense of saving it.

The veins worked at the different mines are quite distinct, perhaps with the exception of the Hand and Benning, which are adjoining properties.

The other ditches in the county are the Battle Branch ditch, which supplies the Dahlonega Gold Mining Company with water, although not owned by them, the Singleton ditch, and the Pigeon Roost, Barlow ditch. There are several others on a smaller scale than these.

On the line of the Findley Branch ditch a hydraulic ram was situated, which raised the water to the top of the hill above the Findley mine; it has now been removed and work is going on at a new site for a 10-stamp mill formerly on the Lawrence property. A steam pump is to be run in the same building, and is to replace the old ram.

Work is at present almost suspended on the Findley mine, owing to the stoppage in the water supply during the erection of the new pump.

A list of the mills, so far as I am acquainted, in this county, either in actual existence, in working order, or in course of erection, is as follows: Martin & Wells, 5 stamps; Feuchtwanger & McAfee, 5 (known as Ogle & Co.); Hussey & Howe, 4; Harvey King, 8; Bagg's Branch, 10; Hand Co., 20; Benning Co., 10; Findley, 24 and 10 (Old Lawrence Mill); Huff & Roberts, 9; Flandin & Brown, 10; Neal Brothers, 10; Davis, 10; Dahlonega, 10; Barlow & Hand, 20 (Old Pride Mill); Sommerauer, 4; Cincinnati Co., 10.

Many of these mills, having passed through various hands, are known by several names, and a great deal of confusion is thereby caused. The Lawrence mill formerly had had only 5 stamps. The old Pride Mill had 40. Your correspondent, whom I have referred to, duplicated several mills under different titles. J. R. Wells and Martin & MacIntosh are the same mill. Ogle & Co. and Pigeon Roost, and Battle Branch and Dahlonega.

J. B. MACKINTOSH, M.E.

## THE MALLETT REDUCTION WORKS OF CANON CITY, COLO.

The average assay of ores treated at this mill is 100 oz., though the price-list shows that 10-oz. ore is purchased. A considerable part of the ores treated come from Georgetown. Capacity of mill, 10 tons per day. The character of the ore is galena and zinc, entirely free from copper, and apparently unfit for leaching. About $600 worth of bullion is shipped from this mill per day; average fineness, 900. The process Mr. MALLETT puts his ores through has but little in common with any thing I have seen. After pulverizing in the ordinary way, the crude ore is molded into bricks, being sufficiently adhesive, from the nature of a solution which is mixed with them, to mold well. These bricks are roasted in a kiln and again pulverized, after which they are merely heated enough to heat the solution, which is to be used hot. After leaching, the silver is precipitated free from lead or basic iron salts, squeezed and smelted. Two hundred and twenty-seven thousand dollars' worth of bullion has been produced by Mr. MALLETT'S process since its discovery, a little more than two years ago.

Mr. MALLETT'S process is a secret of his own, or, rather, the solution he uses. I learn that various parties have been trying to get hold of it, but he will not sell. He is now considering the subject as to whether he will have it patented or not. He is a gentleman who appreciates the ENGINEERING AND MINING JOURNAL.

EM.

## NOTES.

THE REAL INVENTOR OF THE TELEPHONE.—An article in a recent number of the Pekin *Gazette*, written by Chin Hoo, says Kung Foo Whing, a distinguished philosopher who flourished about the year 976, invented the telephone—which is known in China as "Thumthsein" in the year 968!

THE ELECTRIC LIGHT AT THE GAIETY.—The Gaiety Theater is the first public building in London illuminated by the electric light. This has just been done with entire success. The impression of some visitors from the country was that half a dozen harvest moons were shining at once in the Strand.

PENSION TO DR. PRESCOTT JOULE.—Dr. Joule, of Manchester, whose name is inseparably connected with the theory of the mechanical equivalent of heat, and who has done for the laws of current energy what Ohm accomplished in relation to the laws of the voltaic current itself, has, we are glad to learn, been granted a civil list pension of £200 per annum.

NIELLO.—The composition of the Russian tula, or Niello silver, has been hitherto kept secret. According to the *Berliner Tagblatt*, the firm of F. Zacher & Co., in Berlin, have discovered the method of manufacture, and have made it in large quantities. It consists of nine parts silver, one part copper, one part lead, and one part bismuth, which are melted together and saturated with sulphur. This mixture produces the gorgeous blue which has often been erroneously spoken of as steel blue.

A METHOD OF DETERMINING AND SEPARATING STEARIC AND OLEIC ACIDS, proceeding from the saponification of tallow, has been communicated to the French Academy of Sciences by M. David. The principle of the process is based on the fact that when acetic acid is slowly dropped into a solution of alcohol and oleic acid, at a certain stage the oleic acid is found to separate itself suddenly and completely.

FOSSIL SAURIANS.—Mr. Thomas Bain has just sent home from Cape Colony a large collection of fossil saurians. There are among the bones 308 crania, some apparently new to science. Mr. Bain found the head of a saurian in the matrix of the coal within 2 ft. of the seam. Among the known fossils are Dicynodon, Oudenodon parieasaurus, Lycosaurus, Galesaurus, and Cynodracon—*Eng. Mech.*

SCHÜTZENBERGER has reported to the French Academy the existence of an allotropic modification of copper, obtained by galvanic deposition. It possesses a bronze color, with metallic luster, is so brittle as to permit of being powdered in a mortar, and, on treatment with nitric acid, evolves, not nitric oxide as ordinary copper does, but nitrous oxide. The same author has likewise reported that other metals besides copper yield allotropic modifications in a similar manner (notably lead).

THE INTERNATIONAL CONGRESS OF HYGIENE, which met on the 1st of August at the Palace of the Trocadéro, is spoken of as likely to be of the greatest benefit to the cause of sanitary science, and the belief is expressed that it will be, directly or indirectly, productive of many sanitary reforms. The following are among the more important questions open for discussion: (1) Infant mortality; (2) the pollution of watercourses, utilization of sewage, etc.; (3) food and its adulterations;

(4) the dwellings of the poor; (5) injurious trades and industries; (6) infectious diseases.

A NEW BATTERY is described by Ponci, an Italian electrician, which is said to be novel and of great simplicity. It consists of a glass jar and a porous vessel, the latter filled with a solution of ferrous chloride, and having an iron plate as a pole. The outer solution is of ferric chloride, with a carbon plate as a pole. Both solutions should be made up to a strength of thirty-five degrees Baumé. The electro-motive force is said to be nine tenths of a Daniell cell.

THE TRAFFIC OF THE SUEZ CANAL for the first four months of 1878, as compared with the corresponding period of the two years preceding, was as follows:

| | | |
|---|---|---|
| Number of ships passed through | January-April, 1878 | 620 |
| " " " " | " 1877 | 613 |
| " " " " | " 1876 | 576 |
| Transit revenue collected 4 months, | 1878 | £464,876 |
| " " " " | 1877 | 486,388 |
| " " " " | 1876 | 451,200 |

PROF. C. W. C. FUCHS, who has been a careful compiler of earthquake statistics for a number of years, reports for the year ended November 30th, 1877, the occurrence of 109 earthquakes, of which any account was published. These were distributed by seasons as follows:

| | | | |
|---|---|---|---|
| December to February | 33 | June to August | 11 |
| March to May | 31 | September to November | 34 |

The most violent earthquake during the year occurred on the South American coast, on the 9th of May.

A NEW FORM OF METALLIC COPPER.—The existence of an allotropic modification of copper, distinct by its physical and chemical properties, has just been established by M. Schützenberger, who has described those properties to the French Academy—*Comptes Rendus*. The surest way of obtaining it is by electrolysis of a 10 per cent solution of acetate of copper, previously boiled some minutes to expel acetic acid and render it slightly basic. Two Bunsen or three Daniell elements are used, and all rise of temperature in the bath is avoided. The electrodes, platinum negative, copper positive, and larger, are arranged parallel about 3 to 4 centimeters apart. The face of the platinum next the copper is then covered with allotropic copper, while the other face receives a thinner deposit of ordinary copper. The new form has a bronze appearance, with metallic luster, slightly rugose surface; it is brittle, and can be bruised to impalpable powder in an agate mortar, etc.—*Engineer*.

ARTIFICIAL PRODUCTION OF CRYSTAL OF SILICA AND OF THE SILICATES.—At one of the *séances* of the Academy, M. Daubrée presented a method of obtaining crystallizing silica in the dry way. For this purpose the tungstate of soda is employed by M. Hautefeuille, who obtains at will the silica crystallized either in the form of tridymite or of quartz. It has been well known, from the researches of G. Rose, that the phosphates and the tungstates could be made to serve this purpose. But it has been demonstrated by M. Hautefeuille that the tungstate exercises a far more energetic action in this respect than the phosphate; so that at a very moderate temperature, it may be employed to reproduce a number of the more or less fusible silicates that occur in nature.—*Le Technologiste*, xxxviii., 212.

ELECTRO-METALLURGY OF COBALT—A. GAIFFE.—The author has been struck with the beauty of cobalt galvanically deposited, as well as by its hardness. It is not oxidized like iron, and much less care is required to keep its surface in good condition. Its beautiful white color will make it suitable for the decoration of other metals. The bath used was a neutral solution of the double sulphate of ammonia and cobalt, which does not require nearly so much care as the nickel baths. The anode may be a sheet of platinum, or, better, a plate of cobalt, either cast or forged. To obtain a white and adhesive deposit the current ought to be regulated at the outset, at 6 units of electro-motor force of the standard of the British Association, and brought to 3 units only when the entire surface of the article to be coated has become white.—*Chemical News*.

VOLCANIC PHENOMENA.—The captain of a German steamer recently reported that he found the whole of the northeast coast of the island of New Britain, in the South Seas, enveloped in dense smoke, and he experienced great difficulty in proceeding up the channel between it and New Ireland, as fields of pumice-stone, several feet in thickness, covered the surface of the water. On February 9th he reached Makada, Duke of York group, and found that three craters had broken out in the New Britain peninsula, at the foot of the so-called Mother and Daughter Mountains, from which dense masses of pumice-stone were continually being thrown up. A tidal wave swept over Blanche Bay on February 10th, and soon afterward a new island appeared, about three quarters of a mile in diameter. This island is situated to the south of Natopi, or Henderson Island, and where it now is no bottom was previously obtained at seventeen fathoms. The captain of the vessel mentioned further states that the water in Blanche Bay was scalding hot for two days, and that immense quantities of boiled fish and turtle were thrown on shore and eagerly devoured by the natives.—*Engineer*.

CAST MANGANESE.—From the *Chemical News* we learn that Jordan has presented to the French Academy a specimen of cast metal, obtained by treatment of the ores of manganese in the blast-furnace. The composition of this metal is:

| | | |
|---|---|---|
| Manganese | 84·96 | per cent. |
| Iron | 8·55 | " |
| Carbon | 5·70 | " |
| Silicon | 0·66 | " |
| Sulphur | 0·035 | " |
| Phosphorus | 0·005 | " |
| Total | 99·910 | per cent. |

In subsequent operations the percentage of manganese has been carried as high as 87·4 per cent. The specimen laid before the Academy had been preserved for six months without having undergone any sensible alteration. There was noticed a considerable loss of manganese in the furnace, amounting sometimes to as much as 10 per cent, which, with certain other facts, appears to warrant the opinion that this metal is somewhat volatile at elevated temperatures.

ELECTRIC LIGHT.—For some months past the spinning factory of MM. David Trovillier and Adhémar, at Epinal (Department of Vosges, in France), has been illuminated by the electric light, and the results obtained are considered most satisfactory. A space of 1314 square meters is lit up by four lamps, furnished with ground-glass globes and placed 3⅓ meters above the floor. Compared with the light obtained by means of the sixty gas-jets that were formerly used, the electric illumination is very powerful; but, far from complaining of any fatigue resulting from so intense a light, the work-people prefer it to gas. Thus, when the proprietors ran short of the carbon rods used in the lamps, a deputation waited upon them to say that they hoped that the electric lighting would be resumed. By giving due care to the proper reflection of the light, deep shadows are altogether avoided; and even the interior portions of the machines, where no direct rays can penetrate, are illumined by the reflected light. The walls of the factory are whitewashed. One of the most important of the results observed is the absence of any perceptible heating effect upon the atmosphere, even when the work of the factory is continued throughout the night. The power requisite to work the magneto-electric machine producing the light is obtained without difficulty from the hydraulic prime-motor which works the spinning machinery. At Rouen, M. Manteau lights up his weaving factory by electricity; and the square of the *hotel de ville* is often illuminated by six electric lights, the effect of which can not be compared with that obtained by any other system of lighting.—*The Electrician*.

DETERMINATION OF MANGANESE IN IRONS, CAST-IRONS, AND STEELS; IN SPIEGEL, FERRO-MANGANESE, AND ORES—M. DESHAYS.—When to a nitric or nitrosulphuric solution of manganese there is added a certain quantity of plumbic dinoxide, there is immediately produced a violet-red coloration, varying in intensity and in tone according to the quantity of manganese contained in the acid liquor. In all cases the coloration is so much the stronger as the quantity of manganese is more considerable, but it is still perceptible, even in case of extremely minute quantities. The tone varies according as the liquid contains nitric acid alone or a mixture of nitric and sulphuric, according to the degree of oxidation of the manganese, and also according to its origin. Thus, when employing the plumbic acid reaction for the qualitative detection of manganese in cast-irons and ores, we may have tones varying from the red of an onion-skin to a deep violet. To obtain comparable tints it is essentially necessary to operate under the same conditions, and to measure exactly the quantities of acid and of peroxide employed. In spite of these precautions, in the case of ores, the tone of the coloration seems to vary with the state of oxidation of the manganese. This reaction has been applied by M. Leclerc for the determination of manganese in soils and ashes, and subsequently M. Boussingault has used it for irons and steels. These two *savants* employed a standard solution of mercurous nitrate, which, if poured into the violet liquor containing the manganese, reduces the permanganic acid and decolorizes the liquor. Up to 0·300 per cent of manganese the quantity of the reducing liquid employed to produce this decoloration appears proportional to the percentage of manganese; above this it is no longer proportional. The author has sought to utilize this method, but unsuccessfully, the majority of the steels now manufactured by the Bessemer and Martin processes containing more than 0·500 per cent of manganese. On the other hand, in case of cast-irons and ores, he has merely obtained irregular and conflicting results. On substituting for the mercurous nitrate a solution of arsenious acid analogous to that employed in chlorimetry the results appeared better, and the author has thought the method applicable for determining tolerably high proportions of manganese. As the hydrochloric solution of arsenious acid is difficult to prepare and often forms a deposit in the bottles, he has finally adopted the arsenite of soda.—*Chemical News*.

## MINING NEWS.

### COLORADO.

Special Correspondence of the Engineering and Mining Journal.

#### BOULDER COUNTY.

Caribou district shows some improvement. The Caribou silver mill, at Nederland, and the New Jersey Company mill, at Caribou, have both been running for some time. The latter claims to be able to treat twenty-ounce ore. Besides the leading mine, the Caribou, operated by Eben Smith, Joseph Irwin pays a royalty of 20 per cent for working the Native silver mine, Sam Conger is developing a large gold-and-silver-bearing vein on the Boulder County, and Pippin & Co. are opening up a section of the Fourth of July lode. The First National gold mine is now worked by former lessees of the company. North of Caribou district the Washington Avenue silver mill is again being put in order for work. Among the telluride camps, Ballarat displays the most activity, the Smuggler having recently been the largest producer in the county. The John Jay, Cold Spring, and Slide are producing something.

#### JEFFERSON COUNTY.

The Trenton Company's lixiviation works, at Golden, formerly smelting works, will start up on silver ores next week. The Golden Smelting Company is as busy as ever. Large forces of men are employed in the three leading coal mines, at Golden, at the Murphy and Ralston mines, and at that of the C. C. Welch, near Coal Creek. These are on the line of the Colorado Central Railway, and furnish almost all of the coal supply for Golden, Central, Black Hawk, Georgetown, and vicinity.

#### GILPIN COUNTY.

The veins in the new camp of Silver Mountain, north of Black Hawk, are showing up better as development goes forward. The various leasing parties and owners on the Cyclops, Cyclops No. 2, Fannie, St. James, Madison, and others are generally doing well. Three men obtained a few tons of ore in the Fannie in eleven days that sold at the smelting works for $1066.95. They received $866.95 for one and a half tons. The last lot of ore from the Saint James ran 343 ounces of silver. Tyler & Lynn sold 2545 pounds of ore from the Cyclops No. 2 last week for $169.70.

#### CLEAR CREEK.

The Pay Rock is now the leading producer on Republican Mountain, although the Baxter never looked better. The Pelican and Dives yield but little, compared with former times. In this vicinity are the Snowdrift, Silver Plume, Corry City, Bismarck, and the mines cut by the Lebanon Tunnel. On Griffith Mountain the Griffith lode turns out the most ore. Less mining is done on Democrat than for several years. The Little Emma shaft, sunk from the tunnel level 450 feet from its mouth, is 60 feet deep and 240 feet below the surface of the mountain side, and shows ore from top to bottom. The level run west from the bottom of this shaft shows ore worth from $3800 to $4100 per ton.

#### PARK COUNTY.

A Fairplay dispatch to the Denver *News* tends to confirm previous reports of valuable and extensive discoveries on Horse-Shoe gulch and mountain, twelve miles southwest of that town. Numerous assays demonstrate the importance of these discoveries. Carbonate deposits are being opened, assaying from one to two hundred ounces in silver per ton. Within a week over one hundred men have gone in there from various directions, and there is considerable excitement in the older camps over the locality. In case expectations are realized, the former activity of Fairplay will be revived.

### CUSTER COUNTY.

Some new silver discoveries are being made on Round Mountain, near Ula. The Maine or Bassick mine did not turn out as much ore as usual in August. This was not because the ore deposits show any signs of giving out, but because the mine and shaft were being put in better shape for working, and because machinery was being put up. The monthly yield had been something like $50,000 for a part of the spring and summer, with a total yield, for the first year of the mine, up to August, of nearly a quarter of a million; or not far from those figures.

### THE SAN JUAN REGION.

The Ocean Wave Smelting Works at Lake City recently made their first shipment for this season. It comprised 25 tons or 50,000 pounds of silver-lead bullion, carrying from 250 to 300 ounces of silver per ton. Among the paying lodes of Hinsdale County are the Big Casino, Piute, Dolly Varden, Belle Saint Louis and Black Rock. Copper and Poverty Hills are claimed by some to constitute the liveliest and richest camp in San Juan. Solid gray copper ore is blown out of the Dolly Varden by the ton. The Frank Adams, its extension, yielded three tons of ore last week. A specimen assay has given $4295 to the ton.

The *Silver World* editor reviews the prospectus of the Rising Sun Mining Company. It denounces this concern as a swindle and the property incapable of returning a revenue, at least under present management and prospects.

The Silverton Smelting Works, Greene & Co., began on their twenty-fifth ten-ton lot of bullion August 12th, and are now probably on their twelfth ten-ton run. This would make 300 tons of bullion, carrying two or three hundred ounces of silver per ton, this season. The blast-furnace is doing better than ever. The new twenty-ton furnace is nearly completed. Sweet & Mathews's new concentrating works at Silverton are very successful. The Aspen and one or two other properties are in litigation. Good reports come from many veins in the vicinity of Silverton, Animas Forks, and Mineral City. Some of the best ore from the E Pluribus Unum mine near Mineral Point gives 800 ounces of silver to the ton.

The Paquin furnace, at Ouray, turned out a considerable amount of bullion early in August, and lately fired up for a more extensive run. Gulch and creek mining still continues along the San Miguel and other streams with a fair return of gold. Two sacks of quartz from a newly-discovered lode near the Howard fork of the San Miguel gave about $1000 worth of gold. The Pandora, on the San Miguel, shows very large ore-bodies, assaying from $20 to $150 in gold, and from $10 to $90 in silver. Two levels have been run 150 feet. Eleven tons of ore from the Nevada lode assayed 106 ounces. The What Cheer lode will soon be cut by a tunnel at a depth of 125 feet. The Nettie is down 100 feet, with a fine ore-body in the bottom.

Residents of Pekin and Peoria, Illinois, have purchased the celebrated Riche placer claims on the San Miguel, for $30,000. They will invest $25,000 in developing the property, and for machinery, etc.

### MISCELLANEOUS.

The Atchison, Topeka, and Santa Fe Railway people have their Arkansas Valley and New Mexico Railway ironed for 60 miles southwest of La Junta, and to within 20 miles of Trinidad. Over 1000 men are at work at and near the latter place, and the pass through the Raton Mountains. The road will be in operation by September 15th, as far as Trinidad, when the force of graders, etc., will have moved on into New Mexico.

The D. and R. G. Company have a small force of graders at work on the branch road in San Luis Park, near Del Norte. This and the A., T., and S. F. Company each have men at work up the Grand Cañon of the Arkansas, west of Cañon City. Heavy rains, water-spouts, and mountain torrents have done much damage to the Colorado Central and Denver and Rio Grande railways this season. Last week a terrific storm and washout came down from the Greenhorn mountains and carried away fifteen miles of the D. and R. G. track, at the same time destroying farms, stock, and large amounts of property. COIN.

## THE BLACK HILLS.

We are in receipt of private advices of a reliable character, dated Deadwood, August 27th, 1878, to the effect "that the country is developing finely. In the Father De Smet mine, $100 ore is being taken out. Rich strikes in silver have been made three miles from Deadwood and on Bald Mountain. A 40-stamp silver mill is to be erected at Galena. Nearly every mill in the Hills (about 1000 stamps) are running and making healthy 'clean-ups,' some of them very large. In fact, every thing is looking splendidly, and there is not the slightest doubt that the future of the Hills is already an assured success."

We take the following, showing the present condition of the mines and the mining operations in the Hills, from the most recent issues of the Deadwood *Pioneer* and the Central and Lead Cities *Telegraph-Herald*.

### THE FATHER DE SMET.

A very important development has been made in this property by the prosecution of work on the Golden Gate tunnel, the present header of which taps the main vein at a distance of 207 feet below the present workings of the mine. It was no less than the encountering of raw ore (showing no decomposition) which assays over $100 per ton. It is also most incontrovertible evidence of the permanency and true-fissure character of Black Hills quartz, and as such goes abroad to our benefit.

Under the care of Captain I. M. West, the 80-stamp mill of this company is being rapidly built. At the present time one hundred and thirty-five stamps are crushing ore from this mine. Over twenty-five thousand dollars are required to meet the monthly pay-roll of the company.

### LARGE GOLD PROPERTY SALE.

Messrs. Canoll, Frisbee & Folk, mine brokers at Deadwood, sold on the 26th ult. the Vanderbilt, Keystone, and Live Oak lodes, located on Strawberry gulch, for $50,000 cash, a wealthy New York firm, represented by Mr. George Asmus, being the purchasers. They expect to erect mills on the property at once.

### LARGE SILVER PROPERTY SALE.

Mr. C. W. Carpenter, of the Northwestern Stage Company and Dr. Law have effected the purchase of the three silver mines of Bear Butte District—Florence, Flormann, and Red Cloud, and are negotiating for the Spotted Tail and Sitting Bull lodes, of established value. The money expended in the purchase is $60,000. One of the owners has started for Chicago to purchase a 60-stamp mill, with amalgamator, settles, etc.—a complete silver mill with every modern improvement. The cost will exceed $50,000. A force of men has been at work in the mine and grading for the mill.

The Diamond Drill has found its way among the deposits in the Hills, and recent borings into some quartz in Blacktail gulch have disclosed a fine body of cement.

### THE HOMESTAKE MINE.

"About 200 tons of ore are daily crushed at this mine; a recent run of about two weeks gave 2822 oz. of gold, valued at over $40,000, so that the average of the ore is somewhere in the neighborhood of $14 per ton. This property is one that was purchased less than a year ago for $70,000, incorporated in San Francisco with 100,000 shares, and a capital of $10,000,000. The shares sold first for less than four dollars each, but have since touched ten, near which they now stand. Two assessments were levied to build the 80-stamp mill. The body of ore now exposed is practically inexhaustible for an 80-stamp mill, but more will soon be erected. A long list of dividends is probable in the future."

## CALIFORNIA.

### THE BODIE DISTRICT.

We condense the following concerning the mines of this district from the *Standard* of the 28th ult.:

"Bodie District at no period of its history has been so lively as at the present time. Renewed activity and bustle is apparent at every turn, and the number of capitalists investing in mining properties is truly wonderful. Mines are being sold and bonded every day. New hoisting works have been ordered, and are now on the way, for at least fifteen mines, and the smaller claims, which can not stand so large an expense, are putting up whims. New locations are being recorded every day, and the hills around town are fairly alive with prospectors. The bullion shipments from the district this month will be between $600,000 and $700,000, and, no doubt, next month they will be considerably over that amount. The more recent developments in the Standard and Bodie mines show that their richest ore has hardly been uncovered, for the ledges are improving in quality every day. The Hayes mine has been sold for a very handsome price and the mine incorporated by live, go-ahead men. This is a fine claim and has a good ledge in sight. The Red Cloud is cutting some very rich strata, and in a short time the ledge will be cut. The Bodie is still yielding its half-million a month, and the ore is, if any thing, richer than ever before. The usual progress is being made in the drifts and winze and every thing looks well. A shaft has been started on the Bruce ledge and drifting on the Burgess has been commenced. Both ledges are looking splendidly and yielding the usual amount of rich ore.

## NEVADA.

From the mining summary in the *Gold Hill News* of August 28th, we condense the following concerning the principal developments in the mines of the Comstock:

"The confidence of buyers in the stability of the recent ore developments in the Sierra Nevada and Union Consolidated appears to be unbounded, and the stock makes rapid strides of advancement.

"Everywhere along the line renewed efforts are being put forth to open up new levels and determine the value of each portion of undeveloped ground.

"The Ophir mine is now probably in better condition for working the lower levels than it has ever been in the past.

"Julia is still one of the most interesting attractions on the lode. The water is at last drained from the 2000 level, and cross-cut No. 1 is advancing in ore, just entering the margin of the vein. Cross-cut No. 2 is also cleaned out almost to the face, so that, if nothing happens to prevent, we certainly will soon be able to learn something of the definite value of those two drifts.

"The broken pump rods of the Belcher and Crown Point drain shaft have been repaired, and as soon as the water is drained cross-cutting the 2300 levels of those mines can be commenced. The Alta has also several levels almost ready for cross-cutting, and it will be strange indeed, if, out of all the bright prospects presented, other and new ore bonanzas are not soon found."

"The total length of the Sutro Tunnel is 20,473 feet. The header is making good progress, and is rapidly nearing the west wall of the great Comstock ore belt. Definite and satisfactory arrangements having been made with the Julia Mining Company, fully recognizing and acquiescing in the claims of the Sutro Tunnel Company, a branch tunnel south was commenced day before yesterday, which is intended to connect with the Julia mine and continue south to Gold Hill. This south lateral branch will be the full size of the main tunnel—ten feet wide by eight feet high—and its point of commencement is 19,715 feet from the mouth or entrance of the tunnel. The distance through the branch from the main tunnel to the Julia shaft is just 1400 feet, and as work is also to be commenced from the shaft, it is calculated that the branch will be completed to that point and connection made by the 1st of December. Meanwhile a large ditch or conductor for water is to be constructed throughout the entire length of the Sutro Tunnel, as well as the branch, of sufficient capacity to carry all the water which may be pumped or discharged into it from the Julia or other mines of the Comstock. As this water will be hot, the drain will be carefully covered throughout, in order to prevent the heat and steam from it rotting the timbering or heating the air of the tunnel."

## UTAH.

We are indebted to the *Salt Lake Tribune* of August 31st for the following:

"A rich gold strike has been made in the Copperopolis mine near Silver Springs, in Big Cottonwood. The mine is an isolated piece of property, and is developed to the depth of about 100 feet by an incline on a small seam of ore, which, up to recently, has carried only a few dollars in gold to the ton. A few days ago a small streak of rich, free-milling gold ore was struck, and is now some three or four inches thick.

"The Sunset mine, in Bingham, commences sacking ore to-day. It is located near the Stuart. It has a 12-foot vein of free-milling gold quartz which carries ore that averages $50 to the ton.

"All five stacks of the Old Telegraph smelter are running at full blast on Flagstaff and Old Telegraph ores, and from two to three car-loads of bullion are being turned out every twenty-four hours.

"A new strike has been made in the Blue Bell mine, in American Fork cañon. It consists of a 4-foot vein of carbonate of lead and chlorides of silver, assaying from $100 to $200 to the ton. The Blue Bell is an old location in Mary Ellen gulch, owned by Dick Burgess and others, who were doing their assessment work upon the property when the strike was made."

## MISCELLANEOUS.

### THE CARIBOU GOLD MINES OF NOVA SCOTIA.

The Halifax *Chronicle* says:

"At the Caribou mines, upper Musquodoboit, one mile east of the old diggings, there has been a rich discovery of new boulders which promise remarkably well. Messrs. Morell & Co., of Dartmouth, have taken out twenty-eight tons of quartz boulders that yielded fifty-six ounces of gold. The main lead is three feet in width, and is considered very rich. It is supposed it will yield eight or ten ounces to the ton. Miners are actively engaged in opening up this and adjoining properties. A crusher will shortly be erected on the new mines and the work of mining vigorously prosecuted."

### THE CASSIAR (B. C.) PLACER MINES.

The *Colonist* of the 13th ult. reports several shipments from the Cassiar district. Provisions are very high. A large number of Chinese find employment here. The prospects are considered very promising.

A dispatch, dated San Francisco, September 2d, says:

"Rich diggings have been discovered in the Horse Fly country, at Cariboo. The Chinese miners are making $40 to $80 to hand daily."

### IMPORTANT GOLD DISCOVERIES IN MONTANA.

An important gold discovery has been made in the Snow Range, or Shoshone Mountains, the discovery being 250 miles from Fort Custer, Montana. This discovery is located on the north fork of Stinkingwater River, latitude 44° and 30′; longitude 110° and 30′. The diggings are wonderfully rich. There have been only three men at work in the gulch, and they have taken out over 300 pounds of gold in less than four months, using only a hollow log for a sluice-box. It is known as the Whitmore discovery. The best route is *via* the Union Pacific Railroad; thence to Camp Stambaugh or Brown. The Salt Lake *Tribune* says: "This news has been looked for for some time, as these men were known to have gone thither quietly last spring, and miners have been on the lookout ever since. A grand rush will be the inevitable result."

"Last year $30,000 were quietly taken by a party from these diggings."

## STATISTICS OF COAL PRODUCTION.

*This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.*

Comparative statement for the week ending August 31st, and years from January 1st:

| TONS OF 2240 LBS. | 1878. | | 1877. | |
|---|---|---|---|---|
| | Week. | Year. | Week. | Year. |
| *Wyoming Region.* | | | | |
| D. & H. Canal Co.. | 36,527 | 1,333,439 | 647 | 1,284,546 |
| D. L. & W. RR. Co. | 43,307 | 1,326,632 | 3,247 | 1,311,352 |
| Penn. Coal Co..... | 32,214 | 538,636 | 16,106 | 698,269 |
| L. V. RR. Co..... | 11,735 | 518,240 | 2,588 | 591,234 |
| P. & N. Y. RR. Co.. | 1,026 | 20,032 | ..... | 32,931 |
| C. RR. of N. J..... | 15,392 | 613,195 | ..... | 868,101 |
| Penn. Canal Co.... | 3,024 | 210,285 | 2,196 | 226,093 |
| | 143,225 | 4,560,459 | 24,784 | 5,012,526 |
| *Lehigh Region.* | | | | |
| L. V. RR. Co..... | 35,876 | 1,568,758 | 54,602 | 1,960,916 |
| C. RR. of N. J..... | 22,098 | 839,990 | 9,597 | 923,152 |
| D. H. & W. B. RR.. | 126 | 18,311 | 634 | 13,719 |
| | 58,100 | 2,427,059 | 64,833 | 2,897,787 |
| *Schuylkill Region.* | | | | |
| P. & R. RR. Co .... | 156,636 | 3,122,090 | 185,054 | 4,176,561 |
| Shamokin & Lykens Val..... | 19,607 | 366,098 | ..... | 401,721 |
| | 176,243 | 3,488,188 | 185,054 | 4,578,282 |
| *Sullivan Region.* | | | | |
| Sul. & Erie RR. Co. | 1,064 | 20,620 | 731 | 8,982 |
| Total ..... | 378,632 | 10,496,326 | 275,402 | 12,497,547 |
| Increase..... | 103,230 | ..... | ..... | ..... |
| Decrease..... | ..... | 2,001,221 | ..... | ..... |

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent of the whole production.

*Receipts and shipments of coal at Chicago Ill.*, for the week ending August 31st, and year from January 1st.

| | Week. Tons. | Year. Tons. |
|---|---|---|
| Receipts..... | 51,353 | 1,072,183 |
| Shipments..... | 9,278 | 150,833 |

*The Exports of Coal from Baltimore* for the week ending August 30th were .... tons, and since January 1, 23,758 tons, as against 22,994 tons for the corresponding time in 1877.

*The increase of shipments of Cumberland Coal* over the Cumberland Branch, and Cumberland and Pennsylvania railroads amounts to 78,012 tons, as compared with the corresponding period in 1877.

*Receipts of Coal at Boston*, for the week ending August 30th and year from January 1st:

| TONS OF 2240 LBS. | 1878. | | 1877. | |
|---|---|---|---|---|
| | Week. | Year. | Week. | Year. |
| From Alexandria and Georgetown..... | 2,055 | 54,308 | ..... | 40,564 |
| Philadelphia..... | 23,165 | 435,500 | 8,659 | 422,139 |
| Baltimore..... | 2,008 | 104,493 | 5,900 | 94,383 |
| Other places..... | 7,606 | 71,353 | 4,044 | 187,796 |
| Great Britain ..... | ..... | 15,411 | ..... | 1,456 |
| Nova Scotia..... | 1,142 | 11,503 | 2,431 | 20,478 |
| Total..... | 35,976 | 692,568 | 21,034 | 766,816 |

| *Perth Amboy Business:* | Tons. |
|---|---|
| Received for the week ..... | 9,622 |
| Shipped for the week..... | 17,441 |
| On hand August 31st..... | 75,882 |

*Belvidere Delaware Railroad Report for week ending August 31st:*

| | Week. | Year. 1878. | Year. 1877. |
|---|---|---|---|
| Coal for shipment at Coal Port (Trenton)..... | 700 | 5,566 | 12,544 |
| Coal for shipment at South Amboy | 5,693 | 319,648 | 366,554 |
| Coal for distribution..... | 4,242 | 111,604 | 114,572 |
| Coal for Company's use..... | 1,442 | 51,845 | 45,669 |

**The Production of Bituminous Coal** for the week ending August 31st, was as follows:

Tons of 2000 lbs., unless otherwise designated.

| | Week. Tons. | Year. Tons. |
|---|---|---|
| *Cumberland Region, Md.* | | |
| Tons of 2,240 lb..... | 45,937 | 945,929 |
| *Barclay Region, Pa.* | | |
| Barclay R. R., tons of 2,240 lbs..... | 5,202 | 201,107 |
| *Broad Top Region, Pa.* | | |
| Huntingdon and Broad Top R. R..... | 3,463 | 94,643 |
| *East Broad Top..... | 430 | 39,214 |
| *Clearfield Region, Pa.* | | |
| *Snow Shoe..... | 484 | 15,646 |
| *Tyrone and Clearfield..... | 27,542 | 821,058 |
| *Allegheny Region, Pa.* | | |
| *Pennsylvania R. R ..... | 3,950 | 133,912 |
| *Pittsburg Region, Pa.* | | |
| *West Penn R. R..... | 3,903 | 121,288 |
| *Southwest Penn. R. R..... | 463 | 17,199 |
| *Penn & Westmoreland gas coal, Pa. R. R..... | 11,843 | 436,100 |
| *Pennsylvania R. R..... | 10,295 | 260,149 |

*For the week ending August 28th.

**The Production of Coke** for the week ending August 28th:

| Tons of 2000 lbs. | Week. | Year. |
|---|---|---|
| West Penn R. R..... | 1,177 | 55,281 |
| Southwest Penn. R. R..... | 13,610 | 506,850 |
| Penn. & Westmoreland Region, Pa. R. R. | 2,035 | 49,113 |
| Pittsburg, Penn. R. R..... | 2,214 | 65,008 |
| Total..... | 19,036 | 676,252 |

## COAL TRADE REVIEW.

NEW YORK, Friday Evening, Sept. 6, 1878.

### Anthracite.

The "hot wave" that passed over us since our last issue volatilized some of our anticipations of increased business in coal, and this, no doubt, is the cause of the still prevailing dullness in the trade. As a rule, dealers are fully stocked, and can take no more till they succeed in disposing of a portion of what they have, and the hot weather, by keeping many still away from home, has prevented the laying in of house supplies. No doubt the great heat is now over, and in this direction we may look for a much better demand.

In manufacturing, we hear of a poor demand, owing partly to the shaken credit of the mills, which forces them to cut down expenses and the goods made to the absolute necessities, and quite largely also to the substitution of bituminous coal for anthracite. We hear of this going on to an unexpected extent. The comparatively high price of anthracite, and the uncertainty as to how much higher it is going under the rule of the Combination, is inducing many to change over to bituminous coal, and the reports made of results obtained in actual practice of an advantage in equal weights of from five to ten per cent in favor of soft coal are made the most of by the active agents of the Cumberland and Clearfield companies to get new business. There is still more serious substitution of bituminous coal for anthracite going on in the iron trade. The following comparison of the quantity of pig iron produced by anthracite and by coke shows the rate at which this substitution has been going on.

| | Anthracite pig-iron; tons 2000 lbs. | Coke pig-iron; tons 2000 lbs. | Charcoal pig-iron. | Total tons. |
|---|---|---|---|---|
| 1868.. | 893,000 | 340,000 | 370,000 | 1,603,000 |
| 1869.. | 971,150 | 553,341 | 392,150 | 1,916,641 |
| 1870.. | 930,000 | 570,000 | 365,000 | 1,865,000 |
| 1871.. | 956,608 | 570,000 | 385,000 | 1,911,608 |
| 1872.. | 1,369,812 | 984,159 | 500,587 | 2,854,558 |
| 1873.. | 1,312,754 | 977,904 | 577,620 | 2,868,278 |
| 1874.. | 1,202,144 | 910,712 | 576,557 | 2,689,413 |
| 1875.. | 908,046 | 947,545 | 410,990 | 2,266,581 |
| 1876.. | 794,578 | 990,009 | 308,649 | 2,093,236 |
| 1877.. | 934,797 | 1,061,945 | 317,843 | 2,314,585 |

It is apparent from this table that nearly the whole reduction in the total production has been borne by the anthracite, and it will also be noted that in 1875, when the Combination commenced regulating, and in 1876, when it most effectually controlled the price of anthracite coal, the production of anthracite pig rapidly declined, while that of coke-made iron increased. Last year, under the low prices that succeeded the breaking up of the Combination, the production of anthracite again increased, while this year, under the new Combination, it will again show a decline, while coke-made iron is steadily increasing. We hear but one report from the anthracite furnaces—that they are losing money in selling iron at the prices necessary to hold the trade, while the price of coal is increased. Unable to stand the strain upon them, other furnaces will before long be blown out, and the trade will be transferred to the Western or Southern coke works. Nor is the loss to the anthracite coal companies to be measured by the two tons, more or less, of anthracite used in making a ton of pig-iron, but the manufacture of this iron into various forms requires the consumption of four or five tons of coal to the ton of finished product, and the roads lose the freights on the coal, the iron, and the supplies of various kinds consumed in the iron works and coal mines when in operation. Nor is even this all, for the trade is transplanted, and rivals are built up in other regions, which will permanently withdraw the trade from the East.

Anthracite should and will be the cheapest coal that can reach the seaboard. With beds so large that a miner, in his day's work of eight hours, can cut 10 to 15 tons, or say three times as much as an average in bituminous mines—with less than a hundred and fifty miles of road to tide water, there is no apparent reason why anthracite should not be marketed at a profit at a lower price than the coal either from our own bituminous fields or from those of England herself. The one obstacle to cheap anthracite is the enormous investment upon which it is sought to exact interest from the public, and as the price required for coal to yield this interest has restricted its market and diminished the quantity marketed, the price has to be correspondingly increased. This policy, inaugurated for the benefit of a small number of persons largely interested in the securities of the companies, has been as detrimental to the ultimate welfare of the companies as it is injurious to the whole industry.

Low prices of anthracite are not only necessary to build up the industries to which the trade must look for its extension, but they are quite possible with the large production which they would bring about, and nothing but a large production can possibly save the companies now following a policy that threatens the very foundations of the trade.

It is quite true that some of the companies possess greater advantages than others for producing and marketing cheap coal, and in open competition they would naturally secure the lion's share of the business; but this is no reason why those who can swim and save themselves should tie themselves hand and foot to those who can not till they all sink together; nor is there any justice in strangling an industry upon which so much of our national prosperity depends because it pleased the managers of the companies in inflation times to increase what they now count as their *investment*, by *donating* stock or declaring even up to 70 per cent of a stock dividend in a single year, when they were also able to declare 15 per cent cash.

The production of anthracite coal last week was 378,632 tons, as against 443,788 tons the previous week, and 275,402 tons the corresponding week of 1877. The total production from January 1st to August 31st was 10,496,326 tons, as compared with 12,497,547 tons for the like period of last year, showing a falling off this year of 2,001,221.

### Bituminous.

The bituminous trade keeps on "the even tenor of its way," without attracting much attention, though, nevertheless, gradually supplanting its formidable rival. No doubt the prices obtained are not highly remunerative, but if a market can be obtained for a large output they would not be complained of. Economies have yet to be made in the Cumberland, and with the reductions in wages, which a full production and steady work would permit, and the completion of the new road to the Chesapeake and Ohio Canal, prices even below those now ruling would leave a fair profit to the mine owner, and would enormously extend the market for this coal.

The cost of mining, including all charges, except royalty and interest, will not exceed 70 cents a ton in the Cumberland region, while the cost of putting coal on the cars at the pit's mouth, in England, considerably exceeds this. As a matter of interest, for comparison, we give the items of cost, as furnished us by the Secretary of the Coalmasters' Association of Northumberland and Durham. These figures are accurate, and give the average cost at the collieries working in the association:

| | Durham. | Northumberland. |
|---|---|---|
| Hewing..... | $0.36 | $0.52 |
| Other underground labor ..... | 30 | 32 |
| Outside labor... ..... | 17½ | 17 |
| Royalty supplies..... .. | 11½ | 12 |
| Horses, horse keep, repairs, machinery, etc..... | 24 | 22 |
| Taxes and officers' charges ..... | 4 | 5 |
| | $1.23 | $1.40 |

As the wages vary from 80 cents to $1.25 per day, and as the workmen live largely on flour, meat, and other bread-stuffs sent from this country, it seems that no reduction can be made there in the cost of production which we can not also meet. It would seem, therefore, that this country may, in the future, expor coal to very considerable amounts; but, what is still better, we can produce it at a cost that will make of this country, before many years, the workshop of the world.

The coal from the Clearfield region will always find a large market on the line of the roads leading from that field, thanks to the wise policy adopted by the Pennsylvania Railroad, and its surplus can, no doubt, always obtain such satisfactory freight rates as will enable it to enter the Eastern market on fair terms.

### New York.

***Wholesale Prices of Bituminous Coal.***

DOMESTIC GAS COALS.

| Per ton of 2240 lb. | At the Shipping Ports. | Alongside in New York. |
|---|---|---|
| Westmoreland and Penn..... | $4 25 | ..... |
| At Greenwich, Philadelphia .... ..... | | $5 50 |
| At S. Amboy. ..... | 5 00 | 5 50 |
| Kanawha at Richmond ..... | 4 10 | 5 40 |
| Red Bank Cannel, Pa., at Philadelphia.. | 8 00 | 8 50 |
| Youghiogheny, Waverly Co., at Balt ... | 4 00 | 5 65 |
| Despard, West Va..... | 4 50 | 6 00 |
| Murphy Run, West Va., at Baltimore. .. | 3 75 | 5 85 |
| Fairmount, West Va., " " ... | 3 75 | 5 70 |
| Newburg Orrel. Md. " " ... | 3 75 | 6 00 |

| | | | |
|---|---|---|---|
| Cannelton Cannel, West Va | .... | .... | 10 00 |
| " Splint " at Richmond. | 6 00 | | 7 00 |
| " Gas Coal at Richmond | 4 00 | | 5 65 |
| Peytona Cannel, W. Va.. at Richmond | .... | .... | 10 00 |
| MANUFACTURING AND STEAM COALS. | | | |
| Cumberland at Georgetown and Alexandria | 2 75@2 90 | 4 35@4 5 | |
| Cumberland, at Baltimore | 2 90@3 00 | 4 35@4 5 | |
| Cl'rfi'd "Eureka" and "Franklin." | | | |
| At mines | 0 75 | .... | .... |
| At Baltimore | 3 25 | .... | 4 50 |
| At Philadelphia | 3 25 | .... | 4 50 |

FOREIGN GAS COALS.

| | Sterling. | Am. cur'ncy |
|---|---|---|
| Newcastle, at Newcastle-on Tyne | 7s.6d. | $2 50@ $3 50 |
| Liv. House Orrel, at Liv. | 25s. | 13 00 |
| Ince Hall Cannel " | 35s.6d. | 18 00 |
| " Gas Cannel " | 25s.6d. | 10 00@ 10 50 |
| Scotch Gas Cannel, at Glasgow, nominal | 25s. | 7 50 |
| | Gold. | |
| Bl'k House, at Cow Bay, N.S. | $1 75 | $4 50 |
| Caledonia, at Pt. Caledonia | 1 50 | 4 25 |
| Glace Bay at Glace Bay | 1 50 | 4 00 |
| Lingan, at Lingan Bay | 1 50 | .... |
| Intern'l Mines, at Sydney | 1 75 | 4 50 |
| Pictou, Vale Mines, at Pictou | 2 00 | 4 70 |

***Wholesale Prices of Anthracite Coal for September Delivery f. o. b. at Tide Water Shipping Ports, per ton of 2240 lbs.***

| | Lump. | Steamer. | Grate. | Egg. | Stove. | Chestnut. |
|---|---|---|---|---|---|---|
| WYOMING COAL. | $ | $ | $ | $ | $ | $ |
| Lackawana, at Weehawken | .... | .... | .... | .... | .... | .... |
| *Pittston, at Newburg | 3 55 | 3 55 | 3 65 | 3 75 | 4 05 | 3 50 |
| L. Val. Coal Co., at Amboy | .... | .... | .... | .... | .... | .... |
| Kingston at Hoboken | 3 50 | 3 60 | 3 70 | 3 85 | 4 20 | 3 60 |
| Wilkes-Barre at Pt. Johnson | 3 60 | 3 60 | 3 70 | 3 85 | 4 20 | 3 60 |
| Plymouth Red Ash at Port Johnson | ..... | ..... | 3 70 | 3 85 | 4 30 | 3 60 |
| Swoyers at Eliz. Pt. or S.A. | ..... | ..... | ..... | ..... | ..... | ..... |
| LEHIGH COAL. | | | | | | |
| L. V. Coal Co., at P. Amboy | ..... | ..... | ..... | ..... | ..... | ..... |
| Cross Creek, at Port John. | ..... | ..... | ..... | ..... | ..... | ..... |
| Buck Mount. Vein at Elizabeth Port or S. A. | 4 25 | 4 00 | 3 90 | 3 90 | 4 20 | 3 60 |
| SCHUYLKILL COAL | | | | | | |
| *At Pt. Richmond, Phila.* | | | | | | |
| Hard White Ash | 3 30 | 3 30 | 3 30 | 3 45 | 3 85 | 3 35 |
| Free-burning W. Ash | ..... | ..... | 3 25 | 3 40 | 3 85 | 3 25 |
| Schuylkill Red Ash | ..... | ..... | ..... | 3 70 | 3 85 | 3 25 |
| Lorberry | ..... | ..... | 3 70 | 3 85 | 3 85 | 3 35 |
| Lykens Valley Vein | ..... | ..... | 3 70 | 3 95 | 3 95 | 3 55 |
| †*Alongside in N.Y. Harbor.* | | | | | | |
| Hard White Ash | 4 10 | 4 10 | 4 10 | 4 10 | 4 40 | 3 80 |
| Free-burning W. Ash | ..... | ..... | 3 80 | 3 95 | 4 40 | 3 80 |
| Schuylkill Red Ash | ..... | ..... | ..... | 4 35 | 4 50 | 3 90 |
| Lorberry | ..... | ..... | ..... | 4 60 | 4 60 | 4 25 |
| Lykens Valley Vein | ..... | ..... | 4 60 | 4 70 | 4 70 | 4 35 |

* Fifty cents per ton additional for delivery in New York.

† On coal delivered f. o. b. at the Philadelphia and Reading Coal and Iron Co.'s Wharf at Williamsburgh, the current date of harbor freight will be allowed from the prices here given.

***Retail Prices.***

Per ton of 2000 lbs.

*Anthracite.*

| | G. & Egg. | Stove. | Chest. |
|---|---|---|---|
| Pittston coal delivered | $5 00 | $5 00 | $5 00 |
| Lack. coal, delivered below 59th St. | 4 50 | 4 75 | 4 75 |

*Bituminous.*

| | | | |
|---|---|---|---|
| Liv. House Orrel | $18 00 | American Orrel | $11 00 |
| Liv. House Cannel | 18 00 | Red Bank Cannel | 7 00 |
| Am. " | 11 00 | Cumberland | 9 00 |
| Ca'n'lt'n Bl'k, or splint. | 10 00 | | |

**Baltimore.** September 3, 1878.

[Specially reported.]

*Wholesale Prices per ton of 2240 lbs.*
*In cars at Depot N. C. R. R.*

HARD WHITE ASH, FREE-BURNING WHITE ASH, SHAMOKIN, ETC.

| | | | |
|---|---|---|---|
| Lump and Steamboat | $3.85 | Stove | $4.25 |
| Broken | 3.85 | Chestnut | 3.80 |
| Egg | 4.00 | | |

LYKENS VALLEY RED ASH.

| | | | |
|---|---|---|---|
| Broken | $4.15 | Stove | $4.45 |
| Egg | 4.30 | Chestnut | 3.90 |

From wharf or yard to the trade, 50c. per ton additional.
Afloat by cargo per canal barge, 15c. per ton less than in cars at depot.

**Boston.** August 31, 1878.

COAL.—The demand is increasing, while holders are very firm, and prices are now fully up to the circular rates, with freights and insurance added. The brig Ruth, from Port Caledonia, C. B., brought 310 tons coal. Mann & Soule. The brig Arab, from Port Caledonia, C. B., brought 178 tons coal. Darrow, Mann & Co. The schooner Ringleader, from Port Caledonia, C. B., brought 175 tons coal, Mann & Soule. The schooner Advance, from Passboro, N. S., brought 133 tons coal, D. W. Job. The schooner Bonnie Lass, from Sydney, C. B., brought 150 tons coal, D. W. Job & Co. The schooner Mary Matilda, from Pictou, N. S., brought 160 tons coal. Odiorne & Co.

We quote Boston wholesale prices as follows:

| | | | |
|---|---|---|---|
| Anthracite, broken | $4.55 | Caledonia | $4.00 |
| " egg | 4.60 | Newcastle | 4.00 |
| " stove | 5.00 | Cannel, English | 18.00 |
| Franklin | 5 75 | " Library | 15.00 |
| Cumberland | 4.50 | " Buckeye | 11.00 |
| Clearfield | 4 50 | Penn | 5.25 |
| Westmoreland | 5.25 | Youghiogheny | 5.25 |

—*Commercial Bulletin.*

**Buffalo.** September 2, 1878.

[Specially reported by E. L. HEDSTROM.]

Until further notice, the following will be the prices for Scranton, Wyoming, Lehigh, and Blossburg coals, per ton of 2000 pounds, delivered free on board vessels at Buffalo N. Y.:

| | Lump. | Grate. | Egg. | Stove. | Nut. |
|---|---|---|---|---|---|
| Scranton | .... | $4.55 | $4.65 | $4.90 | $4.40 |
| Wyoming | .... | 4.55 | 4.65 | 4.90 | 4.40 |
| Lehigh (Sugar Loaf) | .... | .... | .... | .... | .... |

Blossburg, $3.50, F. O. B.

| | To dealers. | | Retail. |
|---|---|---|---|
| | On cars or boats. | In yard, screened. | Delivered. |
| Grate | $4.15 | $4.25 | $5.15 |
| Egg | 4.25 | 4.35 | 5.25 |
| Stove | 4.50 | 4.60 | 5.50 |
| Chestnut | 4.00 | 4.10 | 5.00 |
| Lehigh Lump | .... | .... | .... |
| Blossburg | 3.25 | 3.40 | 4.00 |

**Milwaukee, Wis.** Sept. 4, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

*Retail price per ton of 2000 lbs.*

| | |
|---|---|
| Lehigh prepared, chippings | @$7.00 |
| " " lump | @ 7.00 |
| Lackawanna prepared (all sizes) | @ 6.00 |
| Briar Hill | @ 5.00 |
| Steam cokes | $3.75@ 4.75 |

**Montreal.** Sept. 5, 1878.

[Specially reported by Messrs. ROBERT C. ADAMS & Co.]

Our market for bituminous coal has steadily declined under the pressure of arrivals of Scotch and English coals, which are selling as low as $3 per ton. There appears to be no chance of a recovery this season, as the supply is far in excess of the demand. The imports of anthracite are less than last year, but stocks on hand were large, and the supply is considered sufficient. Any change is likely to be toward higher prices. We quote:

*Wholesale per 2240 lbs.*

| | | | |
|---|---|---|---|
| Scotch Steam | $3.50 | Cape Breton Steam | $2.75 |
| Pictou | 3.25 | Newcastle Smith's | 4.00 |

*Anthracite at retail, per 2000 lbs. delivered.*

| | | | |
|---|---|---|---|
| Stove | $5.50 | Chestnut | $5.00 |
| Egg | 5.15 | | |

**New Orleans, La.** August 29, 1878.

[Specially reported by Messrs. C. A. MILTENBERGER & Co.

PITTSBURG COAL.

| | | | |
|---|---|---|---|
| At wholesale (by boat-load) | 27c | per bbl. of 180 lbs. | |
| To steamboats | 45c. | " | " |
| " manufactories | 45c. | " | " |
| " families | 50c. | " | " |

In hhds. (for shipment).... $5.00 per hhd. from 5 to 6 bbls.

ANTHRACITE COAL

*Per ton of 2000 lbs.*

| | |
|---|---|
| At wholesale | $7.00 to $8.00 |
| To families etc | 9 00 to 10.00 |

ST. BERNARD (KY.) COAL.

| | | | |
|---|---|---|---|
| To steamboats | 40c. | per bbl. of 180 lbs. | |
| " families | 45c. | " | " |
| Virginia cannel to families | $1.00 | " | " |

**Philadelphia.**

September 5, 1878.

The Schuylkill Region is now idle and will start next Monday to fill the September quota, which can easily be done in less than ten days if enough rain comes down in the mean time to assist the supply of feed-water at the collieries. The demand for local trade shows some slight improvement, and prices are firmer, but any attempt to an advance in tolls or prices beyond present rates or in increasing the quota for this month would throw us back again. The advances made so far are already more than the purchasing public will stand, and the matter has to be handled very tenderly. We believe a fair amount of business can be done for the balance of the year if not over 1,000,000 is produced this month, and that present circular rates can be reached and maintained, but that is the most that can be done. It will not do to try the experiment of last month and gain over half a million of tons in three weeks over last year. A higher rate than last year can also be maintained, but it has gone up too fast and exceeded what will be patiently borne by purchasers. Every advance now, be it ever so slight, will represent a corresponding decrease in the consumption. "People must have anthracite, and they can not do without it," is an exploded doctrine, which prevails only with those who are blind and deaf. What anthracite must be had that people can not do without would not pay one tenth of the interest of the money invested for the production and transportation of it. What anthracite trade is to be had is very large, no doubt, but it is not to be obtained by force; it must be coaxed, and carefully nursed once obtained.

**Pittston, Pa.** Sept. 3, 1878.

Pennsylvania Coal Company's Coal in Yard.

*Retail per ton of 2,000 lb.*

| | |
|---|---|
| Lump, Egg, and Stove | $2 25 |
| Chestnut | 2 00 |
| Pea | 1 00 |

Delivered, 50 cents per ton additional.

**Pittsburg.** September 5, 1878.

COAL.—There is a little mining going on in some of the collieries of the three first pools, which is the only remaining evidence that this industry has still some life left in it. A duller week in the business there has never been than the last. Supplies being ample at home and in the markets depending upon Pittsburg coal, there is really no necessity for activity among the operators. Nevertheless, languidly several barges have been filled and made ready to take advantage of the first navigable season, though none will venture below the mouth of the Ohio until the subsidence of the yellow fever. The more contiguous Kanawha coal keeps operators here on the alert and prepared to meet their competitors below to prevent losing ground by unreadiness to meet them at all points. As the West Virginia region is developed, the competition from there will increase in strength, and if the dealers by reason of contiguity can deliver coal below cheaper than others, the market will be theirs by the operation of the irresistible laws of trade. As nothing has been done within the week past, there is little to say under this head. Quotations are unchanged:

| | | | |
|---|---|---|---|
| Wholesale, on board | 4 | cts. per bush. | $1.06 per ton |
| Retail, delivered | 6½ | cts. " | 1.71 " |

Bushels are rated among dealers here at 76 lbs.—26½ bushels make a ton, nearly.

The barrel that rules the coal measurement in New Orleans contains 2 4-7 bushels of 80 lbs. each, making about 206 lbs. Nine and two thirds of these barrels weigh a ton, within a small fraction.

COKE.—There is no industry of the same magnitude that moves onward with less fluctuation than this. The demand is uniform and reliable, to meet which the manufacture is a very plain matter, to prevent deficiency or surplus. The yearly consumption from the Connellsville district is about 62,400,000 bushels, or 1,248,008 tons, which makes the weekly production average 1,200,000 bushels, or 24,000 tons. We give quotations at home rates, in which 40 lbs. make a bushel, and 50 bushels a ton:

| | | | |
|---|---|---|---|
| Wholesale, per bushel, | 4@4½c.; | per ton | $2.00@2.25 |
| Retail, | 5@5½c.; | " | 2.50@2.75 |

The prices at other points where the Connellsville coke goes are the same as here, with the transportation added. —*American Manufacturer.*

**Richmond, Va.** Sept, 3, 1878.

[Specially reported by S. H. HAWES, Dealer in Coal.]

*Per ton of 2240 lbs. f.o.b.*

| | | | |
|---|---|---|---|
| Kanawha Cannel | $9.00 | New River Bituminous | $3.30 |
| Coalburg Splint | 4.50 | Clover Hill Coal | 2.50 |
| Lewiston " | 4.50 | Norwood Gas and | |
| Kanawha Gas Coal | 4.10 | Steam Coal | 2.70 |

**San Francisco.** August 29, 1878.

COAL.—Imports from January 1st to August 1st, 1878:

| | Tons. | | Tons. |
|---|---|---|---|
| Anthracite | 7,578 | Seattle | 52,626 |
| Australian | 49,860 | English | 16,716 |
| Coos Bay | 19,050 | Mt. Diablo | 65,401 |
| Cumberland | 802 | Rocky Mountain | 371 |
| Bellingham Bay | 2,620 | Ione | 621 |
| Vancouver Island | 84,830 | Carbondale | 2,024 |

The arrivals during the week have been free. Several of the cargoes sold prior to arrival. One cargo of 2100 tons Sydney steam, on the spot, sold at something less than $6 per ton. We continue to receive very liberal supplies of bituminous from the north coast mines, and from British Columbia, and it is really surprising with what promptness all these many cargoes disappear from sight, without apparently causing a ripple upon the market. The price being low, consumption of the same is no doubt greatly enhanced thereby. The arrivals during the week embrace the following cargoes: From Newcastle, N. S. W., per Golden Fleece, 1662 tons; per Carnegie, 1421 tons; Khorasan, 1300 tons; Naworth, 500 tons; also 300 tons anthracite, from New York, per Samuel Watts; from Seattle the North Star had 750 tons; Forest Queen, 765 tons. The British ship Juliet, *en route* from London—lost at sea—had 800 tons cannel. The George Bewley, from Liverpool, had 258 tons coke. British ship Bhotan brings 1410 tons Sydney.—*Commercial Herald.*

**Toledo, Ohio.** Sept. 3, 1878.

[Specially reported by Messrs. GOSLINE & BARBOUR.]

We quote the following prices for coal on cars at Toledo:

*Ton of 2000 lbs.*

| | Grate. | Egg. | Chestnut. | Stove |
|---|---|---|---|---|
| Pittston | $4 80 | $4 90 | $4 65 | $5 15 |
| Wilkes-Barre | 4 80 | 4 90 | 4 65 | 5 15 |
| Lackawanna | 4 80 | 4 90 | 4 65 | 5 15 |

Lehigh lump, $5.75.

*Ton of 2000 lbs.*

| | | | |
|---|---|---|---|
| Straitsville lump | $2 60 | Massillon nut | $2 40 |
| " nut | 2 25 | Willow Bank lump | 2 85 |
| Shawnee lump | 2 60 | " nut | 2 40 |
| " nut | 2 25 | Cumberland | 5 00 |
| Hocking Valley lump | 2 60 | Blossburg | 4 60 |
| " nut | 2 25 | Morris Run | 4 60 |
| Massillon lump | 2 85 | Gas Coal | 3 30 |

Retail prices, delivered in the city, are: Stove, $5.25; Grate, Egg, and Chestnut, $5.

## FREIGHTS.

### Lake Freights on Coal and Iron Ore.

*Representing the latest actual charters up to Sept. 4th.*

| From | To | Rate per ton. | From | To | Rate per ton. |
|---|---|---|---|---|---|
| Ashtabula | Milwauk'e | 30 | Cleveland | Milwaukee | 30 |
| " | Chicago | 40 | Erie | Chicago | 40 |
| " | Toronto | 80 | Escanaba | Cleveland* | 90-$1 |
| " | Cleveland* | 70 | " | Ashtabl'a* | 90 |
| Bay City | Chicago* | 60 | Fairhaven | Chicago | 80 |
| Black Riv. | Chicago | 40 | " | Toledo* | 60 |
| " | Toronto | 85 | Marquette | Chicago | $1.20 |
| Buffalo | Cleveland* | 40 | " | Cleveland* | 1.20 |
| " | Chicago* | 40 | " | Ashtabl'a* | 1.00 |
| " | Milwaukee | 25 | Oswego | Chicago | 80 |
| Charlotte | Chicago | 70 | " | Milwaukee | 80 |
| " | Milwaukee | 80 | " | Detroit | 45 |
| Cleveland | Toronto | 80 | Sandusky | Toronto | 90 |
| " | Chicago | 40 | " | Milwaukee | 50 |

* Iron ore.

Coal freights dull and unchanged.

### Ocean Freights.

Ocean Freights on coal, iron, etc., per ton of 2000 lbs., to and from foreign and domestic ports, for four weeks, ending September 5, 1878, are given below.

| DATE. | From | To | Cargo. | R'te |
|---|---|---|---|---|
| Aug. 6 | Baltimore | Aspinwall | Coal | 5.00 |
| " 7 | Philadelphia | Cienfuegos | Coal | 5.87 |
| " 7 | Bilboa | Philadelphia | Iron ore | 2.45 |
| " 13 | Hoboken | Charlottetown | Coal | 1.50 |
| " 22 | New York | Genoa | Coal | 4.00 |
| " 29 | Port Johnson | St. Johns, N. B. | Coal | 1.00 |
| " 29 | Baltimore | Kingston, Jam. | Coal | 3.50 |
| " 30 | Hoboken | Charlottetown | Coal | 1.40 |
| Sept. 3 | Hoboken | Key West | Coal | 2.25 |
| " 5 | San Francisco | Nanaimo | Coal | 3.00 |

## Coastwise Freights.

*Per ton of 2240 lbs.*

Representing the latest actual charters to Sept. 5, 1878.

| PORTS. | From Philadelphia. | From Baltimore. | From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken. |
|---|---|---|---|
| Albany | | 1.60 | |
| Alexandria, Va | 60 | 60 | |
| Augusta | 1.30 | 1.40 | |
| Bangor, Me | 1.25 | | 80 |
| Bath, Me | 1.10† | 1.25@1.30 | 80 |
| Baltimore | 40 | | |
| Beverly, Mass | 1.10@1.15 | | 80 |
| Boston, Mass | 1.10@1.15 | 1.30 | 80 |
| Bridgeport, Conn | | 1.25 | 55 |
| Bristol, R. I | | | 70 |
| Cambridge, Mass | 1.15 | | 80 |
| Cambridgeport | | | 80 |
| Charleston | 1.00 | | |
| Charlestown | 1.20 | | 90 |
| Chelsea | 1.10 | | |
| East Cambridge | 1.15 | | 80 |
| Fair Haven | 90 | | |
| Fall River | 1.05 | 1.25 | 70 |
| Gloucester | 1.15 | | |
| Hartford | | 1.25 | |
| Hoboken | | | 35 |
| Hudson | | 1.40 | |
| Jersey City | | | 35 |
| Lynn | 1.16@1.20 | | 80 |
| Middletown | | | 90 |
| Nantucket, Mass | | | 90 |
| New Bedford | 1.05 | 1.25 | 70 |
| Newburyport | | 1.45 | 90 |
| New Haven | | 1.25 | 50 |
| New London | | 1.25 | 60 |
| Newport | | | 70 |
| New York | 85@90 | 1.25 | 35 |
| Newark | | 1.25 | |
| Norfolk, Va | 50 | 45 | |
| Norwich | | 1.25 | 70 |
| Norwalk, Conn | | 1.35@1.40 | 55 |
| Pawtucket | 1.15 | 1.40 | 75 |
| Petersburg | | | |
| Philadelphia | | 65 | |
| Plymouth | | | |
| Portland | 95@97½ | 1.25@1.30 | 75 |
| Portsmouth, N.H. | 1.22½ | 1.40 | 90 |
| Providence | 1.00@1.05 | 1.25 | 70 |
| Quincy Point | | | 80 |
| Richmond, Va | 55 | | |
| Rockland | | | 80 |
| Saco | 1.30 | | 1.00 |
| Salem, Mass | | 1.35 | 80 |
| Somerset | | | 70 |
| Staten Island | | | 20 |
| Trenton | | 1.00 | |
| Troy | | 1.65 | |
| Wareham | | 1.40 | |
| Washington | 60 | 60 | |
| Williamsburg | | | 35 |
| Wilmington | | 65 | |

*And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

## Rates of Transportation on Coal for Northern and Western Shipments.

*Per ton of 2240 lbs.*

GENEVA, ITHACA, AND SAYRE R. R

From Coxton, subject to regulations printed below, will be as follows:

| | |
|---|---|
| To East Waverly, N. Y | $1.75 |
| " Ithaca for C. Lake R. R. (local) | 1.70 |
| " " for shipment *via* C. L. R. R | 1.36 |
| " " " " Erie Canal (except for Buffalo | 1.36 |
| " Geneva (local) | 2.10 |
| " Canal points on the N. Y. C. and H. R. R. R. and north of Erie Canal on the S. P. and S. R. R. | 1.68 |
| " Geneva for Rochester and the L. O. S. R. R | 1.79 |
| " " " Buffalo and Tonawanda | 1.54 |
| " " " Genesee and Charlotte Docks | 1.57 |
| " " " Auburn and Cayuga | 2.50 |
| Total rate to Buffalo | 2.70 |
| " " Rochester | 2.43 |

*Regulations.*

A charge of 15 cents per ton will be collected of each consignee on all coal not unloaded within 24 hours after its arrival, and an additional charge of 10 cents per ton for every 24 hours thereafter, Sundays and legal holidays excepted.

No allowance will be made for coal lost from cars on account of broken doors or other defects existing when the cars are loaded.

On coal consigned to Buffalo *via* Ithaca docks the rail rate from Coxton will be the same as the Ithaca local rate.

A charge will be made at Ithaca docks for shipping coal direct from cars to vessels of 15 cents per ton; 12 cents per ton additional will be charged on what is shipped from stock.

All freights to be collected weekly, by drafts on shippers, from Coxton to destination.

ROBERT A. PACKER, President.

SAYRE, Pa., August 31, 1878.

CAYUGA RAILROAD COMPANY.

From Coxton, subject to regulations printed below, will be as follows:

| | |
|---|---|
| To Cayuga (local) | $2.10 |
| " " for Buffalo and Tonawanda | 1.54 |
| " " " Rochester | 1.67 |
| " " " Genesee and Charlotte Docks | 1.57 |
| " " " and all other points on N. Y. C. and H. R. R. (except Auburn and Geneva) | 1.79 |
| " " " Phelps Junction, S. P. and S., and L. O. S. R. R. | 1.79 |
| " " " Auburn | 3.00 |
| Rate L. and B. Junction to Buffalo, Black Rock, Suspension Bridge, *via* Cayuga | 2.70 |
| " L. and B. Junction to Rochester, *via* Cayuga | 2.43 |

*Regulations.*

A charge of 15 cents per ton will be collected of each consignee on all coal not unloaded within 24 hours after its arrival, and an additional charge of 10 cents per ton for every 24 hours thereafter (Sundays and legal holidays excepted.

No allowance will be made for coal lost from cars on account of broken doors or other defects existing when the coal is loaded.

Claims for lost coal will be settled with shippers only.

Charges for freight or tolls will follow the coal from State Line to destination, when consigned to points on and beyond the New York Central Railroad.

10 cents per ton will be charged at Weedsport docks for shipping coal direct from cars to boats, and 12 cents per ton additional from stock, making a total charge on what is shipped from stock of 22 cents per ton.

Freight charges to destination *via* Weedsport and canal, will at all times be made as low as the rates *via* Ithaca and canal, to same destination.

Rates for coal in line cars running over this road will be as low to western points from Lackawanna Junction as via competing routes.

CHARLES A. WARDEN,
Gen'l Freight Agent, S. C. R. R.

AUBURN, September 2, 1878.

PENNSYLVANIA AND NEW YORK R. R. CO.

On and after this date, the rate on coal for Buffalo, for Watkins, Ithaca, and Weedsport, for water shipment; Auburn for New York Central R. R.; Sterling, for Lake Shore R. R., and Fair Haven will be 98 cents per ton, between Coxton and Waverly. On coal for Rochester, *via* Erie R. W., Salamanca, and points west thereof, an additional charge of 10 cents per ton will be made to cover transshipment charges at Waverly. The full rate from Coxton to Buffalo is $2.70; to Rochester, $2.43.

ROBERT H. SAYRE, President.

BETHLEHEM, September 2, 1878.

## IRON MARKET REVIEW.

NEW YORK, Friday Evening, Sept. 6, 1878.

**American Pig.**—The Thomas Iron Co. has sold 3000 tons of No. 2X and forge iron on private terms, but said to be at a low price. We learn of no other business worthy of note. The trade is considerably demoralized, and, unless an improved demand sets in or production be considerably curtailed, prices must go lower, regardless of the statement that present prices do not cover cost. Some thousands of tons might be sold at a dollar or two below late private quotations, but the quantity that could be disposed of by such a concession would benefit the market but little, as it would be taken mostly on speculative account, and the same large stocks would be hanging over the market were an attempt made to advance prices. We quote No. 1 foundry at $16@$18; No. 2, $15@$17, and forge, $14@$15.50.

**Scotch Pig.**—As has been the case for a long time, the business in this article is confined to retail lots. We quote as follows: Eglinton, $22; Coltness, $23.50 @$24; Glengarnock, $23.

We take the following from Messrs. John E. Swan & Bros.' circular of August 23d: The number of furnaces in blast was 96, against 87 a year previous. The quantity of pig-iron in Connal & Co.'s stores was increasing, having reached 191,494 tons, as compared with 155,842 tons at the corresponding time in 1877. The shipments of iron for the week ended August 17th showed a decrease of 5934 tons, as compared with the corresponding week of last year, while the total shipments from December 25th, 1877, as compared with the like period of 1876-7, showed a falling off of 52,388 tons. The imports of Middlesbrough iron show a gain of 7598 tons, as compared with the like period of 1877. The leading brands of No. 1 Scotch iron were quoted as follows: Gartsherrig, 56s.; Coltness, 59s.; Summerlee, 54s.; Langloan, 56s. 9d.; Glengarnock, 54s. 6d., and Eglinton, 49s. 3. Bessemer iron was quoted at Barrow at 61s. for No. 1; 62s. 6d. for No. 2, and 60s. for No. 3. Middlesbrough iron in the Tees was quoted as follows: No. 1 foundry, 42s. 6d.; No. 2, 40s. 6d.; No. 3, 39s.; No. 4., 38s. 3d., and forge, 38s.

**Rails.**—We are reported a sale of 500 tons of steel at $45 at tide-water. No combination has yet been made by the steel-makers. We quote iron rails at mills at $32@$36, and steel at $43@$45.

**Old Rails.**—In all 1500 tons are reported sold on private terms. We quote nominally at $16.50@ $17.50.

**Wrought Scrap.**—300 tons have been sold at $19.50 here. We quote at $19@$20 from yard.

### Baltimore. Sept. 2, 1878.

[Specially reported by Messrs. R. C. HOFFMAN & Co.]

The iron market continues without change. Charcoal irons are firm, with fair inquiry. We quote:

| | | | |
|---|---|---|---|
| Balt. Char. | $26.00@$28.00 | M. & White | $13.00@$14.00 |
| Va. " | 26.00@ 28.00 | C'lC.B.Blooms | 50.00@ 52.00 |
| Anth.No.1 | 19.00@ 20.00 | " " Billetts | 50.00@ 55.00 |
| " " 2 | 18.00@ 19.00 | Refi'd Blooms | @ |
| " " 3 | 16.00@ 17.00 | | |

### Buffalo. Sept. 3, 1878.

[Specially reported by Messrs. PALEN & BURNS.]

| | 4 mos |
|---|---|
| No. 1 Foundry | $17.50 |
| No. 2 " | 16.50 |
| Mill | 15.00 |
| Silver Gray | 16.00 |
| American Scotch A 1 | 18.00 |
| " " B 1 | 17.00 |
| " " No. 2 | 16.50 |

### Chattanooga. Sept. 2, 1878.

[Specially reported by J. F. JAMES, Dealer in Iron & Metals.

| | |
|---|---|
| Tenn., Ala. & Ga. Charcoal, No. 1 Foundry | $16 00@$17 00 |
| Tenn., Ala. & Ga. Charcoal, No. 2 Foundry | 15 00@ 16 00 |
| Tenn., Ala. & Ga. Charcoal, Gray Forge | 13 00@ 15 00 |
| Tenn., Ala. & Ga. Coke, No. 1 Foundry | 18 00@ 19 00 |
| Tenn., Ala. & Ga. Coke, No. 2 Foundry | 16 00@ 17 00 |
| Tenn., Ala. & Ga. Coke, Gray Forge | 14 00@ 15 00 |
| Charcoal or Coke, white and mottled | 13 00@ |
| Old rails | $18 00@$19 00 |
| Old car wh'ls. | 16 00@ 17 00 |
| Wr'ght scrap, No. 1 | 16 00 |
| Wr'ght scrap, No. 2 | $11 00 |
| Cast scrap | 10 00 |
| Muck bar | 30 00@ 32 00 |

IRON ORES.

| | |
|---|---|
| Red hematite or fossiliferous f. o. c. at mines, about 55 per cent metallic iron | $1.25 |
| Brown hematite about 55 per cent metallic iron | 1.75 |

### Cincinnati, O. Sept. 3, 1878.

[Specially reported by Messrs. TRABER & AUBERY, Commission Merchants for the sale of pig iron, blooms, ore, etc.]

Below please find closing quotations of our pig-iron market, viz.:

CHARCOAL.

| | | |
|---|---|---|
| H'n'g Rock | No. 1 Foundry & B 1 | $21 00@$22 00—4 mos. |
| " | No. 2 " | 20 50@ —4 mos. |
| " | Soft Silver Gray | 19 00@ —4 mos. |
| " | Mill | 18 00@ —4 mos. |
| Tennessee | No. 1 Foundry | 21 00@ —4 mos. |
| " | No. 2 " | 20 00@ —4 mos. |
| " | Mill | 18 00@ —4 mos |

STONE COAL.

| | | |
|---|---|---|
| Ohio | No. 1 Foundry | $17 00@ —4 mos. |
| " | No. 2 " | 16 00@ —4 mos. |
| " | No. 3 " | 15 00@ —4 mos. |
| " | No. 4 " | 14 00@ —4 mos. |
| " | Mill | 16 00@ —4 mos. |

COKE.

| | | |
|---|---|---|
| Ohio & W. Va. | No. 1 Foundry | 18 00@ 19 00—4 mos. |
| " " | No. 2 " | 17 00@ —4 mos. |
| " " | Stove | 16 00@ —4 mos. |
| " " | Mill | 17 00@ —4 mos. |

CAR-WHEEL.

| | | |
|---|---|---|
| H'n'g R., C. B | Hecla, Vesuvius, Etna, Buckhorn, Jefferson. | $30 00@ 35 00—4 mos. |
| Maryland, " | Cedar Point | 35 00@ —4 mos |
| Missouri, " | Maramec | 28 00@ —4 mos |

BLOOMS.

| | |
|---|---|
| Charcoal | $45 00@$50 00- cash |

SCRAP IRON.

| | |
|---|---|
| Cast | 40c. @ 45c.—cash. |
| Wrought | 62½c.@ $1.00—cash |

### Columbus, Ohio. Sept. 2, 1878.

[Specially reported by Messrs. KING, GILBERT & WARNER, Dealers in Pig Iron and Ores.]

The inquiries for pig-iron the past week have been more frequent than for some time past. Holders, however, feel confident that better prices are near at hand, and are unwilling to make concessions to effect sales. Quotations remain unchanged.

The usual time, four months, allowed on quotations.

FOUNDRY IRONS

| | |
|---|---|
| No. 1 Hanging Rock Charcoal | $22 00@$22 50 |
| No. 2 " " " | @ |
| No. 1 Hocking Valley soft and strong from pure limestone ores | 18 00@ 18 50 |
| No. 2 Hocking Valley soft and strong from pure limestone ores | 17 00@ 17 50 |
| No. 1 American Scotch | 18 00@ 18 50 |
| No. 1 Moxahala | 18 00@ 18 50 |
| No. 2 " | 17 00@ 17 50 |
| No. 1 Shawnee | 18 00@ 18 50 |
| No. 1 Eliza (Jackson County) | 18 00@ 18 50 |
| Silver Gray | 16 50@ 17 00 |

MILL IRONS.

| | |
|---|---|
| Gray neutral | 16 00@ 17 00 |
| Mottled and white neutral | 15 50@ 16 00 |
| Gray cold short | 16 00@ 16 50 |
| Mottled and white cold short | 15 00@ 15 50 |

**Cleveland, O.** Sept. 3, 1878.

[Specially reported by Messrs. C. E. BINGHAM & Co.]

Per gross ton, on four months' time. Subject to change without notice.

FOUNDRY IRON.

| | | | |
|---|---|---|---|
| No. 1 L. S. Charcoal | $23 00 | Am. S., No. 1, Ch. Val. | $20 00 |
| No. 2 " " | 22 00 | " " B—1, " " | 18 00 |
| No. 1 Anthracite | 20 00 | " " No. 2 " " | 18 00 |
| No. 2 " | 19 00 | No. 1, Massillon | 19 00 |
| No. 1 Bituminous | 20 00 | B—1, " | 17 00 |
| No. 2 " | 18 00 | No. 2, " | 16 00 |

CAR-WHEEL AND MALLEABLE IRON.

| | | | |
|---|---|---|---|
| No. 3, L. S. Charcoal | $24 00 | Nos. 5 & 6, L. S. Char. | $24 00 |
| No 4, " " | 24 00 | | |

BESSEMER IRON.

| | |
|---|---|
| Nos. 1 & 2, L. S. Char | $23 00 |

FORGE IRON.

| | | | |
|---|---|---|---|
| No. 1, Gray | $18 00 | White and Mottled | $16 00 |

**Louisville, Ky.** Sept. 3, 1878.

[Specially reported by Messrs. GEORGE H. HULL & Co.]

The market continues firm at full figures, but without further change in prices.

The usual time, 4 months, allowed on quotations below:

FOUNDRY IRONS.

| | No. 1. | No. 2. |
|---|---|---|
| Hanging Rock Charcoal | $21 00@$22 00 | $19 00@$20 00 |
| Southern Charcoal | 18 00@ 19 00 | 17 00@ 17 50 |
| H'n'g Rock, Stc'l & Coke | 19 00@ 20 00 | 18 00@ 19 00 |
| Southern Stonecoal & Coke | 17 50@ 18 00 | 16 50@ 17 00 |

"Amer. Scotch"... $18@$19 | Silver Gray... $15@$17.00

MILL IRONS.

| | |
|---|---|
| No. 1 Charcoal, Cold-short & Neutral | $16 00@$17 00 |
| No. 1 Stc'l & Coke, Cold-short & Neutral | 16 00@ 16 50 |
| No. 2 Stc'l & Coke, Cold-short & Neutral | 15 50@ 16 00 |
| No. 1 Missouri and Indiana, Red-short | 20 00@ 21 00 |
| White & Mottled, Cold-short & Neutral | 14 00@ 15 00 |

CAR-WHEEL AND MALLEABLE IRONS.

| | |
|---|---|
| Hanging Rock, Cold Blast | $28 00@$30 00 |
| Alabama and Georgia, Cold Blast | 27 00@ 28 00 |
| Kentucky, Cold Blast | 24 00@ 26 00 |

**Milwaukee, Wis.** Sept. 4, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

CHARCOAL IRON.

| | |
|---|---|
| No. 1 Lake Superior per gross ton | $23 00—4 mos. |
| " 2 " " " " | 22 00—4 mos. |

ANTHRACITE IRON.

| | |
|---|---|
| No. 1 Anthracite per gross ton | 23 00—4 mos. |
| " 2 " " " " | 22 00—4 mos. |

STONE COAL AND COKE.

| | |
|---|---|
| Warner's Am Sc'th (Bk. Band, per ton | $24 00@ —4 mos. |
| Soft Silvery per ton | 21 00@ —4 mos. |
| Ohio Stone Coal | 22 00@ —4 mos. |

CAR WHEEL.

| | |
|---|---|
| Lake Superior ores per ton | $24 00@25 00—4 mos |

**Philadelphia.**

eptember 5, 1878.

[Specially reported by JUSTICE COX, JR., & Co., Iron Merchants, 333 Walnut street, Philadelphia.]

**Pig Iron.**—The better feeling manifested last week is showing in many small orders for pig, with one or two orders of a thousand tons and over, but prices remain so unprecedentedly low that producers are loath to report sales; yet these sales are going on in a quiet way, until we are able to report sales this week of about 4000 tons, in lots all the way from 10 tons to 1200 tons. We quote the market steady at the low prices ruling; No. 1, $17 to $19; No. 2, $16 to $18; Gray Forge, $15 to $17.

**Manufactured Iron.**—The mills in this city have not, as yet, made any arrangement with their men; hence all are standing but one that continues to pay the old wages. The trade in bars is a little more brisk, and some good orders are coming on the market. Prices can hardly be said to improve, yet there is a firmness not noticeable for some time. The plate mills are all about as busy as they can be for the time being, and most of them have prospects of work far into the fall. In skelp little is doing, and only small orders are offering. We quote bars 1 7-10 to 2c. per lb.; plate and tank, 2 3-10 to 6c. per lb.; skelp, 1 9-10 to 2c. per lb.

**Rails.**—Steel rails continue in good demand, with firm prices. We quote $42 to $44, at mills.

**Iron Rails** are in more demand; some small sales are reported, with inquiry for large lots, but as the terms of sale do not suit mill owners, the orders are held in abeyance. We quote $32 to $34, at mills.

**Old Rails.**—The demand for old rails is improving. We quote $18.50 to $19.50, as to grade.

**Old Wheels** are quite dull, at $17.50 to $18.

**Scrap.**—Wrought scrap is dull at $20 to $22 per ton; cast, $12 to $14, as to quality.

**Pittsburg, Pa.** Sept. 3, 1878.

[Specially reported by A. H. CHILDS.]

The market has been moderately active during the past week at unchanged prices. Some parties who have sold up close have tried to establish an advance, but without any marked success so far, as there is still plenty of pig-iron of fair quality to be had at present quotations. It is encouraging, however, to note that there is a growing scarcity of the most desirable brands, and that some irons which have been rather neglected hitherto are now finding purchasers.

| | 4 mos. | | 4 mos. |
|---|---|---|---|
| No. 1 F'dry | $19.00@$20.00 | M. & White | $15.00@$16.00 |
| No. 2 " | 18.00@ 19.00 | Hot Blast Ch. | 20.00@ 23.00 |
| Gray Forge | 16.50@ 19.00 | Cold Blast W. | 35.00@ 37.00 |

**Richmond, Va.** Sept. 3, 1878.

[Specially reported by ASA SNYDER, Esq.]

Considerable activity in small orders for foundry pig-iron. Our machine shops, especially such as are engaged on engines and boilers, are busy. No change in quotations.

| | |
|---|---|
| Amer. Scotch Pig Iron | $22.00@$23.00 |
| Anthracite " " No. 1 | 19.00@ 20.00 |
| " " " No. 2 | 18.50@ 19.00 |
| " " " No. 3 | 17.00@ 18.00 |
| " " Mottled | 15.00@ 16.00 |
| Coke " No. 1 | 19.00@ 20.00 |
| " " No. 2 | 18.00@ 19.00 |
| Va. Cold Blast Charcoal Pig Iron, cold short | 19.00@ 22.00 |
| " " " " " neutral | 27.00@ 29.00 |
| " Warm " " " cold short | 18.00@ 20.00 |
| " " " " " mill | 17 00@ 18 00 |
| Old Rails | 16.00@ 17.00 |
| Wrought scrap No. 1 | 17.00@ 18.00 |
| Cast scrap—Machinery | 17.00@ ..... |
| Richmond Refined Bar Iron | 2.00@ 2.10 |
| Horse-shoes | 4.25@ 4.50 |
| Mule-shoes | 5.50@ .. |
| Old Dominion nails (standard size) | 2.25 keg. |

Freight by sail to New York, $1.60 for 2240 lbs.

**San Francisco.** August 29, 1878.

METALS.—Imports during the week have been considerable, both of raw and refined. The general market does not respond to the increased stock, and trade in this line seems to be more than usually quiet, particularly for pig-iron. Of this the ship Samuel Watts, from New York, brought 200 tons. The ship Bertram Rigby, from Liverpool, brought 4943 boxes tin-plate, and the George Bewley, from same, 3537 boxes same.—*Commercial Herald.*

**St. Louis, Mo.** Sept. 3, 1878.

[Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.]

Pig-iron business the past week has been fair. Our fall trade has begun, and we anticipate the usual amount of business. Old rails are coming in right freely, and sales only fair.

COLD BLAST CHARCOAL—ALL NUMBERS.

| | | | | |
|---|---|---|---|---|
| Hanging Rock | $28@$33 | Assorted Bar Iron | $1.75 rates. | |
| Tennessee | 25@ 30 | No. 1 Wr'ght Scrap, | 70c. | cwt. |
| Kentucky | 25@ 30 | Heavy cast | " | 60c. " |
| Missouri | 25@ 30 | Light " | " | 40c. " |
| Georgia | 25@ 30 | Old rails | $19 00@ | $20 00 |
| Alabama | 25@ 30 | Old carwheels | 17 00@ | 18 00 |

| | No. 1. | No. 2. | Mill. | White and Mottl'd |
|---|---|---|---|---|
| Missouri stone coal | $22 00 | $21 00 | $19 00 | $17 00 |
| " charcoal | 20 00 | 19 00 | 18 00 | 16 00 |
| Tennessee charcoal | 20 50 | 19 00 | 17 50 | 16 00 |
| Tenn. coke very soft and strong | 20 00 | 19 00 | 17 00 | 15 00 |
| Hanging Rock charcoal | 24 00 | 23 00 | 21 00 | 20 00 |
| " " cold short | 23 00 | 21 00 | 20 00 | ..... |
| | ExNo.1 | No. 1. | BNo.1. | No. 2. |
| Alice Hanging Rock coke. | $23 00 | $22 00 | $21 00 | $19 00 |
| Moxahala Black Band ores | 23 00 | 22 00 | 21 00 | 19 00 |

## METALS.

NEW YORK, Friday Evening, Sept. 6, 1878.

A review of the metal market shows nothing startling in the way of sales; yet, upon the whole, there is a fair business doing, with prospects of an improvement a little later in the season. For a long time there has been but little speculation. A few years ago there was a great deal of it, and the handling and rehandling of the same lot gave the appearance of great activity. Of late it has been customary for buyers to confine their purchases to small lots necessary to carry them over but a brief period, coming into the market frequently. Though they ultimately take as much or more than in former times, the reduction in the size of their orders prevents the appearance of a large business at any one time, and hence many are misled to believe that there is not a large consumption of metals going on.

Our English advices indicate that speculation in metals in London has been seriously interfered with by the Bank of England increasing its discount rate in its efforts to hold or increase its coin balance.

RECEIPTS OF METALS AT NEW YORK FOR THE FOUR WEEKS ENDING SEPTEMBER 5TH AND YEAR FROM JANUARY 1ST, 1878.

| | Aug. 15. | Aug. 22. | Aug. 29. | Sept. 5. | Year from Jan. 1 |
|---|---|---|---|---|---|
| Copper, bbls | 447 | 1,146 | 632 | 56 | 16,835 |
| Copper, boxes | ..... | .... | ..... | .... | 113 |
| Copper, cakes | 172 | 372 | 449 | ... | 11,859 |
| Lead, pigs | 5,945 | 4,170 | 3,230 | 4,149 | 222,108 |
| Spelter, pieces | ..... | 1,703 | ..... | 549 | 32,214 |
| Quicksilver, flasks | ..... | .... | ..... | 62 | 971 |

**Gold Coin.**—The price of gold during the week under review has ranged from 100⅝ to 100¼, and closed at 100⅝.

**Copper.**—The business of the week under review has been in a very small way at 16c., at which price it is firmer, although unchanged. The cause of this firmness is an effort to sell a large quantity abroad at, it is said, 15½c., and afterward to draw the manufacturers into contracting for a large quantity to supply future requirements. The summer business of the manufacturers has been very light, while the demand for cartridges has been greatly decreased, and, as a consequence, it is thought that the copper contracted for in the spring has not been fully consumed. An effort is being made to lead buyers to suppose that the producers hold a very strong position and are quite indifferent about making sales except at a liberal advance upon late quotations. The fact is that their apparent strength lies in their actual weakness. There is talk of light stocks, but, if any one familiar with the business will consider the matter, it will appear that the stocks of January 1st, added to the production, considerably exceed the known sales, and there must be, somewhere in this country, either here or at the mines, a large amount of copper, perhaps larger than at any previous time. The copper business of this country for several years past has been a series of manipulations, pools, and combinations, and has been upon quite an unnatural basis. In the last efforts of the mining companies, a failure was certainly made in sustaining prices, although certain manufacturers, who were taken into the arrangement, were made to pay a higher price for copper than if they had stayed out. It is not likely that they will be so easily taken in again. Combinations during the last few years have been very attractive to managers of all classes of producing companies doing a business upon small margins of profit, or where economy and skill, though wanting, were required to keep up an existence. In nearly, if not quite all of these cases, the remedy has proved a positive injury, and so the managers of the copper companies will find it. The production of Lake copper is being fully maintained, while "outside" mines are being constantly opened, with prospects of a large product in the future. The result is that we are compelled to look to foreign markets to take a large proportion of our ingot copper. This is sold at such figures as can be obtained, the object being to reduce the home supply to the actual requirements of the market and make the domestic consumer pay the deficiencies all around. Put our own manufacturers upon an equal footing with foreign ones and it will be found that in a few years we shall have a home market for all we can produce, and that instead of shipping our ingot copper as we now do, we shall be sending all classes of manufactures of brass and copper to every part of the world, furnishing employment to thousands of men, and both directly and incidentally benefiting the miner, dealer, manufacturer, and, in fact, the whole trade. The latest cable advices quote Chili bars, in London, at £62, and Best Selected at £68.

The exports of copper from this port for the month of August were 1,693,015 lbs., and from January 1st as follows:

| | Pounds. | | Pounds. |
|---|---|---|---|
| Hamburg | 2,765,027 | Hong Kong | 68,231 |
| Havre | 5,616,771 | London | 168,750 |
| Bremen | 103,274 | Rotterdam | 50,000 |
| Antwerp | 50,000 | Hull | 20,927 |
| Amsterdam | 133,750 | | |
| Liverpool | 12,107 | Total | 8,988,837 |

CHILIAN CHARTERS AND SHIPMENTS OF COPPER.

| | 1878. | 1877. | 1876. | 1875. |
|---|---|---|---|---|
| Charters—Jan. 1 to July 31 | 26,269 | 25,146 | 25,293 | 27,907 |
| Aug. 1 to 15 | 2,200 | 1,359 | 2,192 | 1,175 |
| Shipments—Jan. 1 to July 31 | 25,668 | 26,792 | 27,818 | 26,436 |
| July only | 3,600 | 2,310 | 2,124 | 4,059 |

**Tin.**—Straits tin in London is quoted at £58 10s., in Singapore at $18.20, and Penang, $17.90. Exchange is 3s. 9⅞d. There has been a fair jobbing business done in this market at 13¼@13⅜c. The present price is 13⅜c., weak. 25 tons, due here about the 20th inst., was recently sold at 13¼c., 60 days. L. & F. is nominal at 13¾c. There arrived to-day by the Denmark 4671 slabs of Australian tin. The shipments of tin from the Straits to the United States for the last half of August were but 25 tons; for the whole month, 225 tons. The total shipments for the first eight months of 1877 and 1878 were as follows:

| | 1877. Tons. | 1878. Tons. |
|---|---|---|
| To United States | 2,242 | 2,559 |
| To Great Britain | 2,117 | 1,793 |

**Tin Plates.**—A sale of 5000 boxes of coke tins, at a price considerably below the market quotations, is reported. There is a fair business doing, while there is an improved demand for future delivery. The business in tin plates has been very large this year, although the oil trade has been but a light purchaser so far. We quote as follows: Charcoal bright, ⅛X; Melyn grade, $5.80@$6; and Allaway, $5.60@$5.75; charcoal roofing I. C. 14×20, S. T. P. grade, $5.37½@$5.50; coke bright, 14×20, B. V. grade, $4.75; coke roofing, 14×20, $4.75.

Messrs. Robert Crooks & Co., of Liverpool, under date of August 22d, say of tin and tern plates:

"Any alterations are to lower figures, and there does not yet appear the slightest improvement in prospects. Holders of coke tins particularly are despondent, and not disposed to refuse bids any way near the mark."

**Lead.**—Sales of 350 tons at 3·45c. and 50 tons in lots, at 3·50c., are reported. The market is weak—3·45c. for common, while corroding lead is reported to be offered at 3·60c. Stocks are large, with prospects of increasing.

**Spelter and Zinc.**—Spelter continues in fair request, at 4⅞@5c. for ordinary, and 9c. for Bergen Port from Lehigh ores. Sheet zinc is still quoted at 5¾c.

**Antimony.**—Cookson's is quoted at 12¼c. Hallett's is not in stock ; a fair business is doing.

**Quicksilver.**—The San Francisco *Commercial Herald* of August 29th says : "The tendency of the market is evidently downward. Receipts are light, and the export demand in keeping therewith. The market can not be called otherwise than dull. Small lots can be picked up at 42½@43c. for prompt cash.

**Bullion.**—As indicated in our last, silver has declined in London in the absence of demand for it, and on the increased offerings of India Council bills, and the sale of the latter at the equivalent of ⅝d. per ounce decline as compared with the previous week's sale. It is reported weak at 52d. as though it were expected to go still lower. The decline in sterling exchange here within 10 days has been equal to nearly one cent an ounce for silver, and the probability is that with the early and large receipts of bills drawn against cotton shipments, sterling will decline still more, and thus, independent of the London market for silver, the value of the latter will still further decline.

DAILY RANGE OF SILVER IN LONDON AND NEW YORK, PER OZ.

| DATE. | London Pence. | N. Y. Cents. | DATE. | London Pence. | N. Y. Cents. |
|---|---|---|---|---|---|
| August 31.. | 52⅛ | 114 | Sept. 4 | 52 1-16 | 113¾ |
| Sept. 2.... | 52⅛ | 114 | Sept. 5 | 52 1-16 | 113¾ |
| Sept. 3.... | 52⅛ | 114 | Sept. 6 | 52 | 113½ |

BULLION SHIPMENTS.

We give below a statement showing the latest bullion shipments in addition to those announced in our issue of August 31st :

| | | | |
|---|---|---|---|
| Aug. 19, | Northern Belle, | Nevada..... | $11,054.66 |
| " 22, | Manhattan, | " ..... | 12,232.08 |
| " 23, | Tybo Consolidated, | " ..... | 13,804.49 |
| " 24, | Independence, | " ..... | 14,177.31 |
| " 24, | California, | " ..... | 116,713.00 |
| " 24, | Con. Virginia, | " ..... | 123,735.00 |
| " 25, | Standard, | California..... | 21,146.23 |
| " 27, | Bodie, | " .... | 131,900.48 |
| " 20, | Silver King, | Arizona..... | 13,141.00 |
| " 20, | Peck, | " ..... | 5,996.60 |
| " 21, | Tiptop, | " ..... | 11,167.16 |
| " —, | McCracken, | " ..... | 8,700.00 |
| " 23, | Christy, | Utah..... | 4,089.60 |

*Bodie Mine.*—From July 30th to August 24th the bullion shipped from this mine aggregated $662,000.

*The Congress on Coinage, Weights, and Measures.*—PARIS, September 5.—The Congress on Coinage, Weights, and Measures to-day discussed motions for a universal standard of fineness for gold and silver, the freedom of mints to coin either gold or silver according to the demand therefor, the unlimited right of coinage and exportation, the ratio between gold and silver to be regulated solely by their commercial value, and silver not to be a legal tender for debts over £20.

*Coin in the U. S. Treasury.*—WASHINGTON, September 3.—The following is a comparison of the coin balances of the United States Treasury on September 1st, 1877, and September 1st, 1878 :

| | 1877. | 1878. |
|---|---|---|
| Coin..... | $106,904,936.09 | $238,420,709.57 |
| Coin and silver certificates ..... | 38,525,400.00 | 44,017,850.00 |
| Coin, less coin and silver certificates..... | 68,379,536.09 | 194,402,859.57 |
| Outstanding silver coin. | 34,646,201.17 | 39,366,946.00 |
| Market value of gold... | 104.00 | 100.50 |
| Imports (12 mos. ending July 31st)..... | 461,682,516.00 | 433,206,423.00 |
| Exports (12 mos. ending July 31st)..... | 601,182,298.00 | 704,026,486.00 |

*Forcing the Trade Dollars into Circulation.*—WASHINGTON, September 3.—The Secretary of the Treasury has finally decided that the 10,000,000 of silver dollars now in the vaults must go out. To accomplish this he has caused to be issued a circular, which provides that silver dollars may be obtained by any person in the same manner in which fractional silver currency can now be obtained. Under this decision it is confidently expected that the 10,000,000 silver dollars now in the Treasury vaults will soon go into the volume of the circulation, and while it is probable that a very considerable amount will again be returned to the Treasury as Customs dues, the Treasury confidently expects that a large proportion will remain in general circulation. Meanwhile it is said not to be the purpose to withdraw from circulation the one and two dollar notes, and it is authoritatively stated that any person can receive any desired quantity of these notes on application at the Treasury.

*Refusing the Trade Dollar.*—The New York Central and Hudson River Railroad Company has issued orders to all its agents between New York and Buffalo to refuse the trade dollar in payment for tickets or freight. It is also understood that conductors have received orders not to accept the trade dollar in payment of fares.

*Demand for American Silver in Hayti.*—WASHINGTON, September 4.—John M. Langston, American Minister to the Republic of Hayti, furnished the Department of State with an interesting report as to the use of American silver in that country. He says that our silver is used for all purposes by the government and people. The amount of it circulating in Hayti is not far from $80,000. In the busy season, when coffee is being exported, silver is very abundant in the island. During the dull season, when exports are less abundant, silver is shipped from Hayti.

*Germany and the Silver Conference.*—Considering that Germany has more silver to sell than the United States can use in a decade, it is not surprising that she refuses to take part in the International Monetary Conference. She ought to be willing to do all that she can to make the market as good as possible; but the notice that she will have nothing to do with it is equivalent to saying that she will sell the hundred millions that she has on hand as soon as possible, and for just what she can get. Until that amount is out of the way, it is useless to look for any advance in the value of silver.

*Coinage of the U. S. Mints for August.*—WASHINGTON, Sept. 2.—The following shows the coinage at the mints during August :

| | Pieces. | Value. |
|---|---|---|
| Double eagles..... | 267,470 | $5,349,400 |
| Quarter eagles..... | 50,000 | 125,000 |
| Standard dollars.... | 3,028,000 | 3,028,000 |
| Total coinage..... | 3,345,470 | $8,502,400 |

The total coinage of standard silver dollars up to the close of business on Saturday last was $13,448,500.

*Philadelphia Mint Coinage for August.*—The following is the statement of the coinage executed at the United States Mint, in Philadelphia, for the month of August :

| Denomination. | No. of Pieces. | Value. |
|---|---|---|
| Double eagles..... | 76,470 | $1,529,400 |
| Bland dollars..... | 1,054,000 | 1,054,000 |
| Total for month... | 1,130,470 | 2,583,400 |

During the month of August $350,000 have been coined at the Carson Mint. This is light work, as the Mint has heretofore been coining from $500,000 to $600,000 per month.

*United States Assay Office Business at New York for August.*—The following is the statement of business at the United States Assay Office at New York for the month ending August 31st, 1878 :

| | |
|---|---|
| Deposits of gold..... | $1,017,000 |
| " silver..... | 44,000 |
| " Colorado..... | 370,000 |
| " Lake Superior..... | 6,000 |
| " Montana..... | 50,000 |
| " Nevada..... | 90,000 |
| " New Mexico..... | 21,000 |
| " Utah..... | 140,000 |
| Total deposits..... | $1,738,000 |
| Gold bars stamped..... | 773,528 |
| Silver bars stamped..... | 1,389,544 |
| Total..... | $2,163,073 |
| Transmitted to Mint of United States at Philadelphia for coinage—gold..... | $1,351,423 |

## FINANCIAL.

### New York Stocks.

NEW YORK, Friday Evening, Sept. 6, 1878.

The week under review has been an exceedingly quiet one for the coal stocks. Delaware and Hudson Canal has fallen from 50⅝ to 48⅛, at which price it closed, the sales for the week aggregating 2120 shares. Delaware, Lackawanna, and Western reached 53½ on Tuesday, and declined to 51⅝ to-day, recovering to 52 at the close, the aggregate of sales being 59,420 shares. New Jersey Central, with sales of 2918 shares, ranged from 33 to 34¼, closing at 33¾.

*Bell's Mills and Lloydsville R. R.*—The narrow-gauge railroad, leading from Bell's Mills, Blair County, to Lloydsville, Cambria County, Pa., is about to be extended to the mouth of Whitmer Run, on Clearfield Creek, Clearfield County, about four miles above Glen Hope. This will be a grand outlet for the coal there, which exists in veins six feet thick.

*Pratt Coal and Coke Co.*—The contract for building this company's road has been let to P. W. Smith & Co., of Kentucky. It will be six miles long, from the company's mines, in Jefferson County, Ala., east to Birmingham, where it will connect with the South and North Alabama, and the Alabama Great Southern roads.

*Barclay Coal Co.*—Dividend on stock payable at office.

*Northern Pacific R.R. Co. (Annual Meeting.)*—The annual meeting of the stockholders of the Northern Pacific Railroad Company will be held at its offices in New York, on September 25th, to elect thirteen directors, and also to take action on the proposition to authorize the receipt of the preferred stock of the company in payment for the lands already earned in the State of Oregon and in the Territory of Washington.

COUPONS AND INTEREST on the bonds of the following companies will fall due during the present month :

*American Coal Co.*—Coupons.
*Baltimore and Ohio R. R.*—Sterling loans ; coupons.
*Belvidere and Delaware R. R. Co.*—Second mortgage, guaranteed by the Camden and Amboy R. R. Co.; coupons.
*Cameron Coal Co.*—Coupons due.
*Cleveland and Mahoning Valley R. R. Co.*—Third mortgage ; coupons.
*Cumberland and Pennsylvania R. R. Co.*—First mortgage ; coupons paid by Consolidation Coal Co.
*Himrod Furnace Co.*—Coupons.
*Kemble Coal and Iron Co.*—Coupons.
*Lackawanna and Bloomsburg R. R. Co.*—First mortgage extension ; coupons paid by Delaware, Lackawanna, and Western R. R. Co.
*Schenectady and Duanesburg R. R. Co.*—Coupons paid by Delaware and Hudson Canal Co.
*Straitsville Cannel Coal Co.*—Coupons.
*Union Iron Co.*—Coupons.
*Wheeling Iron and Nail Works.*—Coupons.

### Philadelphia Stocks.

PHILADELPHIA, Friday, September 6, 1878.

The only feature of this market this week has been quietness. The sales of the Lehigh Coal and Navigation Co. only amount to 479 shares at $18.50@$18 ; of Lehigh Valley R. R., 901 shares, $38¾@$39. Pennsylvania R. R., with sales of 20,108 shares, has ranged between $32⅝@$32½. Philadelphia and Reading, with sales of 7566 shares, ranged between $16⅝@16½.

*Pennsylvania R. R.*—RAVENNA, O., September 2.—The Pennsylvania Company to-day completed the survey of a line from Youngstown, O., to this place, connecting at Youngstown with the Ashtabula, Youngstown, and Pittsburg. The Pittsburg line will compete with the Atlantic and Great Western in the coal traffic of the Mahoning Valley.

COUPONS AND INTEREST on the bonds of the following companies will fall due during the present month :

*Connecting R. R. Co.*—First mortgage ; coupons paid by Pennsylvania R. R. Co.
*East Pennsylvania R. R. Co.*—First mortgage ; coupons due.
*Lehigh Coal and Navigation Co.*—Convertible bonds ; coupons in gold.
*Lehigh Valley R. R. Co.*—7 per cent bonds ; interest.
*Pennsylvania R. R. Co.*—Con. mortgage, reg. ; interest.
*Pennsylvania and Delaware R. R. Co.*—Income bonds ; coupons due.

AUCTION SALES.

*Fremont Coal Co.*—$1000 7 per cent mortgage bonds at 90 per cent.
*Pennsylvania Canal Co.*—$10,000 6 per cent bonds at 60 per cent.
*Lehigh Valley R. R. Co.*—10 shares at 38¾.

### Miscellaneous Stocks and Quotations.

Sales and quotations of the stocks and bonds dealt in here, at Philadelphia and Baltimore for the week ending the 6th inst. are given in the following tables. The Philadelphia quotations will have a * affixed. The Baltimore quotations are indicated thus †.

| STOCKS. | Par Value. | High'st | Lowest | Closing | Sales : Shares. |
|---|---|---|---|---|---|
| American Coal Co. | $25 | | | 28 | |
| St. L., I. M. & S. R. Co.. | 100 | | | 5 | |
| Spring Mt. Coal Co. | 50 | | | 50 | |
| *Cambria Iron Co.. | 50 | | | 55 | |
| *Penn. Salt Mf'g Co. | 50 | | | 67½ | 2 |
| *Westm'land C. Co. | 50 | | | 60 | |
| *Buck Mt. Coal Co.. | 50 | | | 36 | |
| *Schuyl. Nav. Co... | 50 | | | | |
| †B. & O. RR. Co. 1st pf | | | | 93 | |
| †B. & O. RR. Co. 2d pf | 100 | | | 85 | |
| " " " " com | 90 | 91½ | 88½ | 91 | 116 |
| †George's C'k C. Co | 100 | | | 86½ | |
| †S. Clara M'g Co... | 100 | | | 25 | |
| †Atlantic Coal Co. | 10 | | | 1.15 | |

| BONDS. | Prine'l. When Due. | Int'est. When Due. | Hig'st. | Lowest | Amount. |
|---|---|---|---|---|---|
| D., L. & W., 7s, conv | 1892 | J. & D. | 104 | | 1,000 |
| " " " 2d mtge. | 1881 | M. & S. | | | |
| N. J. C., 1st mtge. new | 1890 | F. & A. | | | |
| " " " 1st mtge., con | 1899 | Q. | 72½ | | †2,000 |
| " " " convt..... | 1902 | M. & N. | 69½ | | †3,000 |
| Lehigh & W. B., con | 1899 | Q. | 60 | | *34,025 |
| Am. Dock & Imp. 7s | | J. & J. | | | |
| St. L. I. M. & S. 1st mt | 1892 | F. & A. | 104¼ | 104 | 3,000 |
| Ches. & O., 1st mtge | 1899 | M. & N. | | | |
| D & H C Co., 1stm. rg | 1884 | J. & J. | 101¼ | | 2,000 |
| " " " " " | 1891 | J. & J. | 101⅝ | 101 | 5,000 |
| " " " " m. loan cp | 1894 | A. & O. | | | |
| " " " " " rg. | 1894 | A. & O. | | | |
| " " " " new mge. | | | | | |
| *L. V. R., 1stm. 6s. cp. | 1898 | J. & D. | | | |
| " " " " rg. | 1898 | J. & D. | 111½ | | 5,000 |
| " " " 2d m. 7s, rg. | 1910 | M. & S. | | | 113½ |
| " " " con. m. 6s, rg | 1823 | J. & D. | 99¼ | | 2,000 |
| " " " 6s cp. | 1923 | J. & D. | 99⅞ | 99½ | 7,000 |
| *Pa. RR., 1st m. 6s, cp | 1880 | J. & J. | 104⅝ | | 1,000 |
| " " g. m., 6s, cp. | 1910 | J. & J. | 107¼ | | 2,000 |
| " " " 6s, rg. | 1910 | A. & O. | | | |
| " " con. m. 6s, rg. | 1905 | Q. | | | |
| " " " 6s, cp. | 1905 | J. & D. | | | |
| " " new loan, 5s | | | 111¾ | | 16,500 |
| *P. & R. R., 1st m. 6s, R. C. 43-44..... | 1880 | J. & J. | | 104 | |
| P. & R. R., 1st m. 6s, R. C. 48-49..... | 1880 | J. & J | | | |
| P. & R. R., 2d m. 7s cp | 1893 | A. & O. | | | |
| " " " scrip.... | 1882 | J. & J. | 58 | | 1,020 |
| " " " in. m. 7s, cp | 1896 | J. & D. | | | |
| " " " c. m. 7s, cp. | 1911 | J. & D. | 102½ | | 2,000 |
| " " " " 7s. rg. | 1911 | J. & D. | | | |
| " " " cvt. 7s, R.C | 1893 | J. & J. | | 63 | |
| " " C. & I. Co., Deb 7s, R. C..... | 1892 | M. & S. | | | |
| & R.C. & I. Co., m. 7s, R. C..... | '92–3 | various | | | |
| L. Nav. Co., 6s, rg. m. | 1884 | J. & Q. | | 105 | |
| " " RR., rg. m. | 1897 | F. & Q. | | 104½ | |
| " " cvt. co. G. R. | 1894 | M. & S. | | 92 | |
| " " " Gold R. C. | 1897 | J. & D. | | 92 | |
| " " con. m. 7s, rg. | 1911 | J. & D. | | 70 | |
| *P. & N. Y. C., 7s, R.C. | 1896 / 1906 | J. & D. | | | |
| *Pa Canal, 6s. cp.. | 1910 | J. & J. | 60 | | 14,000 |
| *Schuyl. Nav., 1st m. 6s. rg..... | 1897 | M. & Q. | | | |
| *Sus. Coal, 6s, rg... | 1911 | J. & J. | | | |
| †Balt. & O. RR., 6s.. | 1880 | J. & J. | | | |
| " " " " 6s.. | 1885 | A. & O. | | 105 | |

Total transactions for the week.....$100,545

* $29,025 sold at from 49⅞@47. † Assessed.

### Gas Stocks.

NEW YORK, Friday Evening, September 6, 1878.

*A Novel Plan for Displaying the Electric Light.*—A new method for suspending an electric lamp to a balloon, is proposed by Mr. M. D. Converse. A copper cable which serves as a conductor for the electricity from the dynamo-machine to the carbons in the lamp is wound around a cylinder which is operated by the same engine that works the dynamo-machine. This cable may at once supply the electricity and control the movements of the balloon. It is claimed for this that the light may be made either stationary or portable, and that its height may be gauged to suit circumstances, also that the bottom of the balloon may be constructed to serve as a reflector for the distribution of the light, and that it may be constructed at a comparatively small additional expense. There being but very little weight to the lamp, a very small balloon will lift it to any desired height.

It is proposed to introduce the electric light in Baltimore this winter.

*Amalgamation of Providence, (R. I.) Gas Companies.*—PROVIDENCE, September 2.—The old Providence Gas Co.,

# COAL TRANSPORTATION AND GENERAL MINING STOCKS.

## COAL STOCKS.

| NAME AND LOCATION OF COMPANY. | | Feet on Vein. | Capital Stock. | SHARES. No. | SHARES. Par Val. | ASSESSMENTS. Total levi'd to date. | ASSESSMENTS. Date and amount per share of last. Mo. | Yr. | Amt. | DIVIDENDS. Total paid to date. | Last Dividend. Mo. | Yr. | Amt. | Rate per Ann. | HIGHEST AND LOWEST PRICES PER SHARE IN CURRENCY AT WHICH SALES WERE MADE. N. B.—Quotations of D., L. & W. R. R., and Pa. Coal Co. are per $100—two shares. Aug. 31. H. | Aug. 31. L. | Sept. 2. H. | Sept. 2. L. | Sept. 3. H. | Sept. 3. L. | Sept 4. H. | Sept 4. L. | Sept. 5. H. | Sept. 5. L. | Sept. 6. H. | Sept. 6. L. | SALES. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $ | | | $ | | | | $ | | | | Per c'nt | | | | | | | | | | | | | |
| Consol. Coal | Md. | | 10,250,000 | 102,500 | $100 | * | | | | | Jan. | 1877 | 2½ | | | | | | | | | | | | | | |
| Del. & H. Canal | Pa. | | 20,000,000 | 200,000 | 100 | * | | | | 38,821,104 | Aug. | 1876 | 4 | 9 | 50 | 50 | 50⅛ | 49⅝ | | | 50⅜ | 50 | 50 | 49⅛ | 49⅛ | 48⅞ | 2,120 |
| Del., Lac. & W. R. R. | Pa. | | 26,200,000 | 524,000 | $50 | * | | | | | July | 1876 | 2½ | 5 | 53 | 52⅛ | 53¼ | 52⅝ | 33½ | 52¼ | 54 | 53¼ | 53⅜ | 52 | 52¼ | 51⅝ | 59,420 |
| Lehigh C. & Nav. | Pa. | | 10,448,550 | 208,971 | 50 | * | | | | | Nov. | 1876 | 1½ | 5½ | 18 | 18 | | | 18¼ | 18¼ | 18½ | 18¾ | 18 | 18 | 18⅜ | 18 | 479 |
| Lehigh Valley R. R. | Pa. | | 27,228,855 | 540,858 | 50 | * | | | | | July | 1878 | 1 | | | | 38⅞ | 38⅞ | 39 | 38¾ | 39 | 38¾ | 38⅞ | 38¾ | 39 | 38⅞ | 921 |
| Maryland Coal | Md. | | 4,400,000 | 44,000 | 100 | * | | | | | Jan. | 1876 | 1½ | 1½ | | | | | | | | | | | | | |
| N. J. Central R. R. | Pa. | | 20,000,000 | 206,000 | 100 | * | | | | | Apr. | 1876 | 2½ | 2½ | 33½ | 33⅛ | 33⅛ | 33 | 33¼ | 33¼ | 34¼ | 33½ | 34¼ | 34 | 34¼ | 33¾ | 2,918 |
| Pennsylvania Coal | Pa. | | 5,000,000 | 100,000 | 50 | * | | | | | May. | 1878 | 3 | | | | | | | | | | | | | | |
| Pennsylvania R. R. | Pa. | | 68,870,200 | 1,337,404 | 50 | * | | | | | May. | 1877 | 1½ | 8 | 32¼ | 32¼ | 32⅝ | 32⅛ | 32⅝ | 32⅜ | 32¾ | 32¼ | 32⅜ | 32⅛ | 32⅞ | 32¾ | 20,106 |
| Phil. & Read. R. R. | Pa. | | 34,278,175 | 685,56[illegible] | 50 | * | | | | 43,012,497 | Jan. | 1876 | 2¼† | 10 | 16½ | 16¼ | 16⅝ | 16½ | 16⅝ | 16⅜ | 16¾ | 16¼ | 16⅝ | 16¼ | 16⅜ | 16¾ | 7,506 |

## GENERAL MINING STOCKS.

### Dividend Paying Mines.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| American | Col. | | 1,000,000 | 100,000 | 10 | * | | | | 80,000 | Sept. | 1878 | $0 10 | 12 | 6 | 5½ | | | | | | | | | | | | | 200 |
| Belcher, g. & | Nev. | 1,040 | 10,400,000 | 104,000 | 100 | 1,288,200 | July | 1878 | 1 00 | 15,397,200 | Apr. | 1876 | 1 00 | 12 | | | | | | | | | | | | | | | |
| Bobtail, g. & | Col. | 2,500 | 1,136,630 | 227,326 | 5 | * | | | | 56,831 | Nov. | 1877 | 25 | | | | | | | | | | | | | | | | |
| Bobtail Tunnel, g. | Col. | | 100,000 | 20,000 | 5 | 52,000 | July | 1873 | 0 30 | 48,000 | June | 1878 | 50 | 20 | | | | | | | | | | | | | | | |
| California, g. s. | Nev. | 600 | 54,000,000 | 540,000 | 100 | | | | | 29,160,000 | Aug. | 1878 | 1 00 | 24 | 15¼ | 13½ | 13 | 12¾ | | | | | 13½ | | 12¾ | | 190 |
| Calumet & Hecla, c. | Mch | | 2,000,000 | 80,000 | 25 | 1,200,000 | | | | 13,450,000 | Aug. | 1878 | 5 00 | 20 | * | | | | 177¼ | 177 | 177¼ | | 1.78 | | | | 48 |
| Central, c. | Mch | | 500,000 | 20,000 | 25 | 100,000 | June | 1862 | 0 65 | 1,260,000 | Feb. | 1878 | 5 00 | | | | | | | | | | | | | | |
| Cholar Potosi, g. s. | Nev. | 1,400 | 2,800,000 | 28,000 | 100 | 1,750,000 | Sept. | 1878 | 5 00 | 3,080,000 | Feb. | 1872 | 1 00 | | | | | | | | | | | | | | |
| Copper Falls, c. | Mch | | 1,000,000 | 20,000 | 50 | 535,000 | May. | 1876 | | 100,000 | Nov. | 1871 | 1 00 | | | | | | | | 15½ | 14½ | | | | | 300 |
| Cons. Virginia, g. s. | Nev. | 710 | 54,000,000 | 540,000 | 100 | 474,600 | June | 1873 | 3 00 | 40,500,000 | June | 1878 | 1 00 | 12 | 13¾ | 12½ | 12¼ | 12 | | | 12½ | 12¼ | 13 | 12½ | 13¼ | 13 | 600 |
| Confidence, g. s. | Nev. | 130 | 2,496,000 | 24,960 | 100 | 256,320 | Apr. | 1878 | 0 50 | 78,000 | May. | 1865 | 8½ | 8½ | | | | | | | | | | | | | |
| Cons. Her. & Roe | Col. | 16,500 | 1,000,000 | 100,000 | 10 | * | | | | 120,000 | | | | | | | | | | | | | | | | | |
| Crown Point, g. s. | Nev. | 600 | 10,000,000 | 100,000 | 100 | 1,773,370 | June | 1878 | 1 00 | 11,588,000 | Jan. | 1875 | 2 00 | 24 | | | | | | | | | | | | | |
| Eureka Cons., g. s. L. | Nev. | | 5,000,000 | 50,000 | 100 | 100,000 | | 1876 | 1 00 | 2,950,000 | Aug. | 1878 | 3 00 | 24 | | | | | | | | | | | | | |
| Eureka G. Mg., g. | Cal. | 1,680 | 2,000,000 | 20,000 | 100 | | | | | 2,149,000 | Apr. | 1878 | 0 25 | | | | | | | | | | | | | | |
| Franklin, c. | Mch | | 500,000 | 20,000 | 25 | 360,000 | June | 1876 | 5 00 | 585,000 | Nov. | 1871 | 1 00 | | | | | | | | | | | | | | |
| Gould &Curry, g. s. | Nev. | 612 | 10,800,000 | 108,000 | 100 | 2,666,000 | Apr. | 1878 | 1 00 | 3,826,800 | Oct. | 1870 | 10 00 | | | | | | | | | | | | | | |
| Grand Prize | Nev. | 1,500 | | 100,000 | | 100,000 | July. | 1878 | 1 00 | 400,000 | Feb. | 1878 | 1 00 | | | | | | | | | | | | | | |
| Hale & Norcross, g. s. | Nev. | 400 | 11,200,000 | 112,000 | 100 | 2,914,000 | Aug. | 1878 | 1 00 | 1,598,000 | Apr. | 1871 | 5 00 | 12 | | | | | | | | | | | | | |
| Hukill, g. s. | Col. | 3,288 | 1,000,000 | 100,000 | 10 | * | | | | 200,000 | Sept. | 1878 | 0 10 | 12 | | | | | | | | | | | | | |
| Kentuck, g. s. | Nev. | 35 | 3,000,000 | 30,000 | 100 | 300,000 | Aug. | 1878 | 1 00 | 1,252,000 | Mar. | 1870 | 5 00 | | | | | | | | | | | | | | |
| Leopard, L. g. s. | Nev. | 1,500 | 5,000,000 | 50,000 | 100 | 150,000 | June | 1878 | 50 | 162,500 | Dec. | 1876 | 0 50 | | | | | | | | | | | | | | |
| Merrimac, s. | Mas. | 1,500 | 500,000 | 100,000 | 5 | * | | | | 120,000 | Mar. | 1878 | 0 10 | 12 | | | | | | | | | | | | | |
| Minesota, c. | Mch. | | 1,000,000 | 20,000 | 50 | 436,000 | June | 1869 | 1 00 | 1,820,000 | Mar. | 1876 | 0 50 | | | | | | | | | | | | | | |
| Moose | Col. | 39,000 | 2,000,000 | 200,000 | 10 | * | | | | 200,000 | Mar. | 1878 | 0 25 | 10 | | | | | | | | | 2.95 | | | | 600 |
| National, c. | Mch. | | 500,000 | 20,000 | 25 | 195,000 | Oct. | 1875 | 1 00 | 360,000 | Oct. | 1873 | 1 00 | | | | | | | | | | | | | | |
| N. Y. & Colorado, g. | Col. | | 1,000,000 | 50,000 | 20 | * | | | | 20,000 | Mar. | 1877 | 0 20 | | | | 1.85 | | | | 2 | | 2 | 1.90 | | | 700 |
| Northern Belle, s. | Nev. | 1,600 | 5,000,000 | 50,000 | 100 | | | | | 1,425,000 | Feb. | 1878 | 1 00 | | | | | | | | | | | | 11½ | | 10 |
| Ontario. | Uth. | 3,000 | 10,000,000 | 100,000 | 100 | | | | | 1,600,000 | Aug. | 1878 | 1 00 | 12 | 39 | | *38¾ | | 39 | | 40 | 39½ | 40 | | | | 824 |
| Ophir, g. s. | Nev. | 675 | 10,080,000 | 100,800 | 100 | 3,236,000 | June | 1878 | 1 00 | 1,394,400 | Mar. | 1864 | 4 00 | | | | | | | | | | | | | | |
| Pewabic, c. | Mch. | | 500,000 | 20,000 | 25 | 185,000 | June | 1868 | 3 00 | 460,000 | July | 1873 | 1 00 | | | | | | | | | | | | | | |
| Phœnix, c. | Mch. | | 1,000,000 | 20,000 | 50 | 817,500 | Sept. | 1870 | 3 00 | 20,000 | Jan. | 1876 | 1 00 | | | | | | | | | | | | | | |
| Plumas | Cal. | | 1,000,000 | 100,000 | 10 | | | | | 60,000 | Aug. | 1878 | 10 | | 4.10 | | 4.15 | 4 | 4.15 | | 4.15 | 4.10 | | | | | 900 |
| Polar Star, g. s. | Col. | 1,300 | 500,000 | 50,000 | 10 | * | | | | 5,000 | Jan. | 1878 | 0 10 | | | | | | | | | | | | | | |
| Quincy, c. | Mch. | | 200,000 | 20,000 | 10 | | | | | 2,230,000 | Feb. | 1878 | 5 00 | | | | | | | | | | | | | | |
| Raymond & Ely, g. s. | Nev. | 5,000 | 3,000,000 | 30,000 | 100 | 600,000 | Aug. | 1878 | 1 00 | 3,075,000 | Sept. | 1873 | 3 00 | | | | | | | | | | | | | | |
| Ridge, c. | Mch. | | 500,000 | 20,000 | 25 | 200,000 | | | | 90,000 | Feb. | 1875 | 1 00 | | | | | | | | | | | | | | |
| Rye Patch | Nev. | 1,800 | | 30,000 | | 97,500 | Nov. | 1876 | 0 50 | 105,000 | Dec. | 1877 | 0 25 | | | | | | | | | | | | | | |
| St. Joseph, L. | Mo. | 2,000 acs. | 1,000,000 | 100,000 | 10 | | | | | 250,000 | | | | | | | | | | | | | | | | | |
| Savage, g. s. | Nev. | 800 | 11,200,000 | 112,000 | 100 | 3,860,500 | June | 1878 | 1 00 | 4,460,000 | June | 1869 | 3 00 | | | | | | | | | | | | | | |
| Seaton, g. s. | Col. | 1,700 | 500,000 | 50,000 | 10 | * | | | | 10,000 | May | 1877 | 0 10 | 12 | | | | | | | | | | | | | |
| Sierra Nevada, g. s. | Nev. | 3,650 | 10,000,000 | 100,000 | 100 | 2,050,000 | July | 1878 | 1 00 | 102,000 | Jan. | 1871 | 1 00 | 10 | | | | | | | | | | | | | |
| Silver King | | | | | | | | | | 400,000 | Aug. | 1878 | 0 50 | | | | | | | | | | | | | | |
| Standard | Cal. | | | 50,000 | | 50,000 | July | 1878 | 1 00 | 450,000 | Aug. | 1878 | 1 00 | | | | | | | | | | | | | | |
| Yellow Jacket, g. s. | Nev. | 1,200 | 12,000,000 | 120000 | 100 | 3,678,000 | Apr. | 1878 | 2 00 | 2,184,000 | Aug. | 1871 | 2 50 | | | | | | | | | | | | | | |

### Non-Dividend Mines.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Allouez, c. | Mch. | | 1,000,000 | 20,000 | 50 | 940,000 | May | 1876 | 5 00 | | | | | | | | | | | | | | | | | | | | |
| Alpha, g. s. | Nev. | 300 | 3,000,000 | 3,000 | 100 | 240,000 | Mar. | 1878 | 1 00 | | | | | | | | | | | | | | | | | | | | |
| Am. Flag, g. | Col. | 5,300 | 600,000 | 60,000 | 10 | * | | | | | | | | | | | 14c | | | | | | | | | | | | 200 |
| Bertha & Edith. g. | Vir. | 645 acs. | 3,500,000 | 350,000 | 10 | * | | | | | | | | | 5c | | 6c | | 5c | | 5c | | 6c | 5c | 5c | 4c | 6,300 |
| Best & Belcher, g. s. | Nev. | 545 | 10,080,000 | 100,800 | 100 | 438,590 | Apr. | 1878 | 1 00 | | | | | | | | | | | | | | | | | | | | |
| Buckeye | Col. | | 2,000,000 | 400,000 | 5 | * | | | | | | | | | | | 40c | 39c | 38c | 37c | 39c | 38c | 40c | | 44c | 42c | 5,300 |
| Bullion, g. s. | Nev. | 943½ | 10,000,000 | 100,000 | 100 | 2,952,000 | Aug. | 1878 | 1 50 | | | | | | | | | | | | | | | | | | | | |
| Caledonia, g. s. | Nev. | 2,188 | 10,000,000 | 100,000 | 100 | 1,440,000 | May. | 1878 | 0 50 | | | | | | | | | | | | | | | | | | | | |
| Cashier | Col. | | 500,000 | 250,000 | 2 | * | | | | | | | | | | | | | | | | | | | | | | | |
| Cleveland, g. | Col. | 3,715 | 250,000 | 25,000 | 10 | * | | | | | | | | | | | | | | | | | | | | | | | |
| Cons. Imperial, g. s. | Nev. | 468 | 50,000,000 | 500,000 | 100 | 675,000 | Apr. | 1878 | 0 20 | | | | | | | | | | | | | | | | | | | | |
| Con. N. Slope & E. C. T. | Col. | 15,000 | 500,000 | 10,000 | 50 | * | | | | | | | | | | | | | | | | | | | | | | | |
| Dahlonega | Ga. | | 250,000 | 250,000 | 1 | * | | | | | | | | | 15c | | 16c | 14c | 17c | 15c | 16c | 15c | 17c | | 15c | 14c | 9,200 |
| Dana, c. | Mch. | | 500,000 | 20,000 | 25 | 68,000 | Jan. | 1863 | 0 50 | | | | | | | | | | | | | | | | | | | | |
| Dawson, s. | Ont. | | 1,200,000 | 60,000 | 20 | | | | | | | | | | | | | | 3½ | | | | | | | | | | |
| Duncan, s. | Ont. | | 1,200,000 | 60,000 | 20 | 75,000 | July | 1876 | 4⅛ | | | | | | | | | | | | | | | | | | | | |
| Exchequer, g. s. | Nev. | 400 | 10,000,000 | 100,000 | 100 | 380,000 | Jan. | 1878 | 1 00 | | | | | | | | | | | | | | | | | | | | 100 |
| Gold Placer, G. | Col. | | 5,000,000 | 200,000 | 25 | | | | | | | | | | | | | | | | | | | | | | | | |
| Granville, G. | N. C. | 357 acs. | 1,000,000 | 100,000 | 10 | * | | | | | | | 0 50 | | 29c | 27c | 29c | 27c | 30c | 28c | 27c | | 34c | 25c | 36c | 31c | 24,700 |
| Humboldt, c. | Mch. | | 500,000 | 20,000 | 25 | 100,000 | Sept | 1876 | 0 15 | | | | | | 1 | | 1 | | | | 1 | | | | | | 300 |
| International, s. | Ont. | | 1,200,000 | 60,000 | 20 | | | | | | | | | | | | | | 50c | | | | | | | | | | 200 |
| Julia, g. s. | Nev. | 3,000 | 11,000,000 | 110,000 | 100 | 525,000 | Jan. | 1878 | 0 75 | | | | | | | | | | | | 7 | | | | | | | | 100 |
| Justice, g. s. | Nev. | 2,100 | 10,500,000 | 105,000 | 100 | 2,658,500 | Aug. | 1878 | 1 50 | | | | | | | | | | | | | | | | | | | | |
| King's Mountain, g. | N. C. | | 1,200,000 | 120,000 | 10 | * | | | | | | | | | | | | | | | | | | | | | | | |
| Lacrosse | Col. | 3,900 | 1,000,000 | 100,000 | 10 | * | | | | | | | | | | | | | | | | | | | | | | | |
| Luzerne | Col. | 4,200 | 5,000,000 | 500,000 | 10 | * | | | | | | | | | 28c | | 28c | | 29c | 28c | 30c | 28c | 30c | 28c | 30c | 28c | 20,300 |
| Madison, c. | Mch. | | 500,000 | 20,000 | 25 | 123,000 | Sept | 1876 | 0 10 | | | | | | | | | | | | | | | | | | | | |
| Mariposa preferred | Cal. | 44,387 | 5,000,000 | 50,000 | 100 | 1,425,000 | June | 1877 | 1 00 | | | | | | | | | | | | | | | | 1.90 | | | | 100 |
| " common | Cal. | acres. | 10,000,000 | 100,000 | 100 | 1,425,000 | June | 1877 | 1 00 | | | | | | 2 | | | | 11½ | | | | | | | | | | 100 |
| Memphis | Col. | 6,000 | 300,000 | 60,000 | 5 | * | | | | | | | | | | | | | | | | | | | | | | | |
| Mesnard, c. | Mch. | | 500,000 | 20,000 | 25 | 160,000 | Apr. | 1876 | 0 50 | | | | | | | | | | | | | | | | | | | | |
| Mexican, g. s. | Nev. | 600 | 10,080,000 | 100,800 | 100 | 217,400 | May. | 1878 | 0 50 | | | | | | | | | | | | | | | | | | | | |
| Mt. Bross Tunnel | Col. | 8,600 | 2,000,000 | 200,000 | 10 | * | | | | | | | | | | | | | | | | | | | | | | | |
| Overman, g. s. | Nev. | 1,200 | 3,840,000 | 38,400 | 100 | 3,289,080 | Aug. | 1878 | 3 00 | | | | | | | | | | | | | | | | | | | | |
| Osceola, c. | Mch. | | 1,000,000 | 40,000 | 25 | 2,567,880 | Nov. | 1877 | 3 00 | | | | | | | | | | | | | | | | | | | | |
| Petherick, c. | Mch. | | 500,000 | 20,000 | 100 | 165,533 | Mar. | 1876 | 0 50 | | | | | | | | | | | | | | | | | | | | |
| Pleasant View, g. | Col. | 1,200 | 200,000 | 20,000 | 10 | * | | | | | | | | | | | | | | | | | | | | | | | |
| Quicksilver preferred | Cal. | 8,500 | 4,291,300 | | | * | | | | | | | | | | | | | | | | | | | | | | | |
| " common | Cal. | acres. | 5,708,700 | 100,000 | 100 | | | | | | | | | | | | | | 12 | | | | 33⅓ | | | | | | 100 |
| Rockland, c. | Mch | | 500,000 | 20,000 | 25 | 495,000 | Jan. | 1874 | 1 00 | | | | | | | | | | | | | | | | | | | | |
| Seg. Belcher, g. s. | Nev. | 160 | 640,000 | 6,400 | 100 | 244,800 | Apr. | 1876 | 5 00 | | | | | | | | | | | | | | | | | | | | |
| Silver City, g. s. | Nev. | 3,900 | 6,310,000 | 63,100 | 100 | 15,775 | Nov. | 1876 | 0 25 | | | | | | | | | | | | | | | | | | | | |
| Silver Hill, g. s. | Nev. | 5,400 | 10,800,000 | 108,000 | 100 | 1,242,000 | July. | 1878 | 0 50 | | | | | | | | | | | | | | | | | | | | |
| Star, c. | Mch. | | 500,000 | 20,000 | 25 | 265,000 | Mar. | 1876 | 0 50 | | | | | | | | | | | | | | | | | | | | |
| Superior, c. | Mch. | | 500,000 | 20,000 | 25 | 340,000 | Mar. | 1874 | 0 25 | | | | | | | | | | | | | | | | | | | | |
| Union Cons. g. s. | Nev. | 850 | 10,000,000 | 100,000 | 100 | 310,000 | Apr. | 1878 | 0 25 | | | | | | | | | | | | | | | | | | | | |

g. Gold. s. Silver. L. Lead. c. Copper. * Non-Assessable. † A dividend of 3⅛ per cent. was declared on the preferred stock of this Co. in July, 1876.

| | | | |
|---|---|---|---|
| Total Assessment levied to date | 52,056,040 | Total Sales of Coal Stocks for the week | 93,512 shares |
| Total Mining Dividends to date | 229,815,332 | Total Sales of Mining Shares for the week | 71,472 " |

at a meeting this afternoon, approved the agreement for the absorption of the Citizens' Gas Company, which has lately put the price of gas down to $1 per 1000 feet.

*Lighting the Streets of New York.*—"The estimated cost of lighting the street lamps of New York for 1879 is $530,000—$70,000 less than the appropriation for 1878. The reduction is accounted for by the decrease in the cost of gas. It costs less to light the lamps of this city than these of any other city in the country."

*The Hamilton (Ohio) Gas Difficulty.*—At a meeting of the citizens of this place on the 2d inst., the following resolutions were adopted:

*Resolved*, 1. That monopolies of whatever kind or description are contrary to that spirit of liberty and freedom of trade which has heretofore characterized our political institutions, as being nothing more than a system of extortion under the authority and form of law, and we denounce the gas monopoly of this city as the most merciless, exacting and extortionate of all. 2. That as private consumers of gas we are willing to pay at the rate of $2.50 per 1000 feet, and no more, and we hereby mutually pledge each other to burn oil instead of gas until such time as the gas company shall agree to and accept an ordinance of the City Council fixing the price of gas for private consumers at the rate aforesaid, being fully convinced that the only way to obtain the desired end is to insist and order out all the gas meters at once. 3. We cordially invite our sister wards of the city to unite with us in our firm and deliberate purpose not to use gas at the rate of $3, which we are determined and abundantly able to sustain to the last extremity.

*The Boston Gas-Light Co.* paid a quarterly dividend of 2½ per cent on its capital stock September 2d.

COUPONS AND INTEREST on the bonds of the following companies will fall due during the present month:

*Baltimore Gas-Light Co.*—Gold; coupons.

*Central Gas-Light Co.*—Coupons.

*Champlain and Urbana Gas-Light and Coke Co.*—Coupons.

*Citizens' Gas Co. of Rochester.*—Coupons.

*Westchester Gas Co.*—Coupons.

AUCTION SALES.—*Manhattan Gas Co.*—10 shares; $50 par, at $200¼ per share.

*Metropolitan Gas-Light Co.*—2 shares @$132 per share; also $120 scrip @103¼ per cent.

*Lycoming Gas and Water Co.*—$6000 second mortgage, 6 per cent bonds @25 per cent.

The following list of Companies in New York and vicinity is corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad street, New York:

| COMPANIES IN NEW YORK AND VICINITY. | Capital Stock. | Par. | DIVIDENDS. Rate per ann. | Am. of last. | Date of last. | QUOTATI'NS Bid. | As'd |
|---|---|---|---|---|---|---|---|
| | $ | | P. ct. | | | | |
| Mutual, N. Y. | 5,000,000 | $100 | 6 | 1½ | July, '78 | 72 | *76 |
| " Bonds | 90,000 | 1,000 | 6 | 3½ | Aug., '78 | ..... | 102 |
| N. York " | 4,000,000 | ..... | 8 | 4 | May, '78 | 90 | 95 |
| Metrop. " | 2,500,000 | 100 | 10 | 5 | Aug., '78 | 129 | 135 |
| " Certfs. | 1,000,000 | ..... | 7 | 3½ | " '78 | 100 | 103 |
| Harlem " | 1,850,000 | 50 | 6 | 3 | Feb., '78 | 75 | 82 |
| Manhat. " | 4,000,000 | 50 | ....‡ | 5 | May '78 | 180 | 190 |
| Brooklyn, Bkln. | 2,000,000 | 50 | 15 | 5 | Apr., '78 | 145 | 157 |
| Nassau ..... | 1,000,000 | 25 | ....‡ | 3 | July, '78 | 73 | 77 |
| " Certfs. | 700,000 | 1,000 | 7 | 3½ | May, '78 | 90 | 97 |
| People's..... | 1,000,000 | 10 | ....‡ | 3½ | Jan., '76 | 20 | 30 |
| " Certfs. | 300,000 | 1,000 | 7 | 3½ | July, '78 | 75 | 85 |
| " Bonds | 325,000 | ..... | 7 | 3½ | May, '78 | 90 | 96 |
| Metrop. " | 1,000,000 | 100 | 5 | 2½ | May, '78 | 60 | 67 |
| W'msb'g " | 1,000,000 | 50 | 8 | 1½ | July, '78 | 75 | 80 |
| " Certfs. | 1,000,000 | ..... | 7 | 3½ | July, '78 | 95 | 100 |
| Citizens' | 1,200,000 | 20 | ....‡ | 3 | July, '78 | 73 | 80 |
| " Certfs. | 320,000 | 1,000 | 7 | 3½ | Apr '78 | 97 | 100 |
| J. C., N. J. | 750,000 | 20 | 10 | 7½ | July, '78 | 150 | 160 |
| Municipal, N. Y. | 466,000 | 50 | ..... | ..... | ..... | 95 | 100 |
| " Bonds | 750,000 | ..... | ..... | ..... | ..... | ..... | ... |
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | ... |

*Ex Dividend.

### Copper Stocks.

Reported by WILSON W. FAY & Co., Brokers in Mining and Miscellaneous Stocks, Room 7, Traveller Building, 31 State street.

BOSTON, Wednesday Evening, Sept. 4, 1878.

The market on coppers continues comparatively active, though there is no great amount of business doing in any of the stocks. A comparison of to-day's quotations with those of last week's shows a slight improvement in the prices of most of the stocks, and we do not doubt that a rise of the present price of copper from its low rate would make a decided activity and improved prices, but until there is an improvement in the price of copper these stocks will not be very likely to make any great excitement in the market.

Calumet and Hecla has remained steady during the week, having sold at 177, and closing at 177 bid, and 177½ asked.

Central is quiet, at 30@35.

Copper Falls is a little stiffer, having sold at 1⅝, and closing at 1 9-16@1 11-16.

Franklin is also firmer, closing at 6@6½, and sales at 6¼.

The National, which was sold at auction for non-payment of assessment, is reported to have brought 50c. per share, probably bought in by the company, as there was some sold on the street for 30c., assessment paid.

Osceola is firm at 8½@9½, and no sales.

Pewabic is quiet, at about 1½.

Quincy is firmer, having sold at 12½, and closing at 12⅝@12¾.

Ridge is quiet, at 1⅛@1⅜.

Duncan has fallen off again to 3⅜ bid, and 3⅝ asked, most of the sellers being afraid of an assessment.

International is firm at 50 bid, and 55 asked, and sales at 53.

### Gold and Silver Stocks.

NEW YORK, Friday Evening, Sept. 6, 1878.

Arrangements have been made to facilitate dealings in this market in the San Francisco stocks. Next week official quotations will be received at the Mining Exchange several times each day. Stocks in the names of certain parties will be a good delivery and dealings will be made on account. The interest in these stocks continues to increase, and it has been impossible for the brokers at the Mining Exchange to do the business offered them, owing to the incomplete arrangements. There has, however, been a very fair business the past week. We note sales as follows: 190 shares of California, at $15¼@$12¾; 600 Consolidated Virginia, at $13¾@$12¼; 10 Northern Belle, at $11½; 100 Julia, at $7; 600 Leviathan, at 80@90c. Considerable quietness has existed in the stocks listed here only. We note sales as follows: American, 200 shares, at $6@$5½; Moose, 600, at $2.95; Ontario, 824, at $38¾@$40; Plumas, 900, at $4@$4.15; Granville, 300, at $1. The low-priced stocks have had the following transactions: American Flag, 200, at 14c.; Bertha and Edith, 6300, at 6 @4c.; Buckeye, 5300, at 37@44c.; Dahlonega, 9200, at 17@14c.; Gold Placer, 24,700, at 25@36c.; Lacrosse, 20,300, at 28@30c. The Ontario Silver Mining Co. announces another double dividend (for August) of one dollar per share, or $100,000 in all, payable at the office of Wells, Fargo & Co., on the 15th inst. The Plumas, Hukill, and American each announce dividends.

Mr. Trask, the Chairman of the Committee of Securities of the New York Mining Exchange, returned to-day, and expresses himself very much in the manner in which we have done for a long time. He states that some actual frauds have been forced on this market, and that most of the other mines have been highly overrated. He spent two months in Colorado with an expert, and has returned with a stock of knowledge that, if appreciated by the Mining Exchange, will prevent more than an occasional imposition. It is to be hoped that the Committee of Securities will carefully weigh any suggestions he may make for their guidance. He is highly impressed with the mineral wealth of Colorado, and believes that if only the truth be put forward under the proper auspices, a large amount of Eastern capital will find profitable investment in the mines of that State. He further knows that there are enough genuine and promising mining properties that can be secured at their true value, to attract the attention of our brokers and promotors, and that they will do much toward advancing the mining and their own interests by devoting their attention to these alone. When Mr. Trask makes known the result of his investigations, look out for a tumble in the majority of the stocks.

The Plumas National Quartz Mining Company's property being located in an out-of-the-way county in California we were for a long time unable to get information of it except from the local press and the company's officers. We have lately received information from one of our correspondents confirming the statements of the company's officers as to what the company is now earning and the developments and improvements that are being made. We are this week in receipt of the Superintendent's report which says: "The total amount of ore extracted and milled for the six months ended June 30th was 5949½ tons. The total amount of gross earnings, $69,741.28 (being an average of $11.96 per ton); expenses, $26,735.69, leaving net $43,005.59; dividends paid, $39,600, leaving a balance to credit of Reserve Fund, July 1st, 1878, $3405.59. I will also add that we have broken in the mine and mill about 250 tons of good milling ore." A letter to the President of the company states: "The additional ten stamps are being erected, and I hope to have them at work on or about the 25th of this (August) present month." Mr. H. C. Bidwell, the Superintendent, is now here, and can be seen at the office of the company at 54 Broad street.

The La Ligua Gold Mining Company has been organized under the laws of the State of New York, with a capital stock of $5,000,000, divided into 50,000 shares of $100 each, for the purpose of working the Catapilco gold mines in Chili. From the company's prospectus we learn that the property is composed of 25,000 acres in all, and that 2800 acres are placer ground varying in depth from 28 to 150 feet. It is estimated that this deposit will yield over 75 cents per cubic yard. With the completion of proposed hydraulic works it is estimated that dividends of over $2,000,000 per annum can be paid. The office of the company in this city is at 104 John street, but all stock for sale is in the hands of John Hitchcock, President Commonwealth Insurance Company, Boston.

Prominent in the following is the continued advance in the New Bonanza stocks, the Sierra Nevada and the Union Consolidated. On the 4th inst. the former stock advanced to $110 per share, and the latter to $98, receding, however, the day following to $101@$83, and opening to-day at $97.50 and $77 per share, respectively. The transactions in these stocks are very large, amounting to about 15,000 shares each per week. On the 30th ult. the public were admitted to these mines, and the general views which are reported in the Pacific coast papers as expressed by various experts who examined the lower levels, are very favorable, and the Sierra Nevada Bonanza is generally considered as only second in importance to the big bonanza. Mexican is up in sympathy with the market, closing last night at $44 and opening to-day at $43, an advance of $12 for the week. Ophir took a decided jump yesterday, advancing to $54.50 from $44 on the day previous, and opening to-day at $49.50, which is a slight advance on the quotations of a week ago.

SAN FRANCISCO MINING STOCK QUOTATIONS.

*Daily Range of Prices for the Week.*

| NAME OF COMPANY | CLOSING QUOTATIONS Aug. 30. | Aug. 31. | Sept. 2. | Sept. 3. | Sept. 4. | Sept. 5. | Opening Sept. 6. |
|---|---|---|---|---|---|---|---|
| Alpha..... | 16¼ | 14¾ | 14⅞ | 14½ | 14½ | 14¼ | 14½ |
| Belcher.... | 14⅛ | 13⅜ | 15⅛ | 14⅞ | 15⅛ | 13⅞ | 13 |
| Best & Bel. | 23¾ | 21 | 23 | 25½ | 24 | 23¾ | 23 |
| Bullion..... | 11¾ | 8½ | 10⅛ | 9⅜ | 8¼ | 8⅛ | ..... |
| Caledonia... | 4¾ | 4 | 4 | 4⅛ | ..... | 4 | ..... |
| California.. | 12⅞ | 12 | 12⅞ | 12⅞ | 13 | 12⅛ | 12½ |
| Chollar-Pot | 39½ | 35½ | 34 | 37½ | 37⅛ | 35½ | ..... |
| Con. Imp.... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Con. Va..... | 13 | 12 | 11⅞ | 11⅝ | 12 | 12¾ | 12½ |
| Confidence.. | 8 | 8 | 9¼ | 8½ | 8¾ | 8 | ..... |
| Crown P'int | 10⅝ | 9¼ | 10⅛ | 11 | 10⅞ | 10⅝ | 11 |
| Eureka Con | 40½ | 41 | 40½ | 41 | 40½ | 41½ | 38 |
| Exchequer. | 5⅜ | 4½ | 5⅜ | 5⅛ | 4⅞ | 4¾ | ..... |
| Gould &Cur | 12⅝ | 10¼ | 10⅝ | 11⅞ | 12⅛ | 12⅛ | 12½ |
| Grand Prize | 5¾ | 6 | 6¼ | 6¼ | 6½ | 6¼ | ..... |
| Hale & Nor. | 11⅝ | 9⅞ | 9⅞ | 10⅛ | 10¾ | 10 | 9½ |
| Julia..... | 10¼ | 8½ | 9¼ | 6 | 7⅜ | 6¾ | ..... |
| Justice..... | 9¼ | 7⅞ | 10⅜ | 9⅜ | 9⅝ | 9⅜ | 10½ |
| Kentuck ... | 5⅜ | 5¾ | 6¼ | 7 | 6⅞ | 6½ | ..... |
| Mexican.... | 32½ | 24½ | 28 | 34¼ | 39¼ | 44 | 43 |
| North. Belle | 9¼ | 9½ | 9½ | ..... | 11 | 10⅞ | ..... |
| Ophir ..... | 48 | 41½ | 42 | 43¾ | 44 | 54½ | 49½ |
| Overman... | 21 | 18¼ | 19¾ | 17½ | 16¾ | 18½ | 18½ |
| Ray. & Ely. | 3½ | 3¾ | 4 | 3¾ | 3¾ | 3¾ | 4 |
| Silver Hill.. | 4 | ..... | 4 | 2½ | 3¾ | 3½ | ..... |
| Savage..... | 14 | 12⅜ | 13¼ | 13⅜ | 14⅝ | 13¾ | 14 |
| Seg.Belcher | 39½ | 40 | ..... | 32 | 32 | 34 | ..... |
| Sierra Nev. | 65½ | 48½ | 71½ | 92½ | *90½ | 101 | 97½ |
| Union Con. | 39 | 32¼ | 43½ | 55¾ | *77¼ | 83 | 77-81 |
| Yel. Jacket. | 22 | 17¼ | 22 | 21¾ | 22⅝ | 22¾ | 22 |

* After the closing of the board Sierra Nevada closed at 110, and Union Consolidated at 98.

We are informed through recent mail advices that holders of the bonanzas—California, Consolidated Virginia, and Ophir—are availing themselves of the opportunity which is given them by the excited and buoyant state of the market, to sell. It is stated, in this connection, that the Nevada Bank Brokers have been prominent sellers of Ophir. The comparatively large sales of these stocks recently, strengthens the suggestion of our correspondent, as also does the fact that reports of favorable indications in mines which were almost forgotten, now obtain popular credence, and probably also victims, who may purchase in them. The *Commercial Herald*, of August 29th, says in this connection:

"The mining share market is now being flooded with outside stocks, every day witnessing the placement of some new wildcat, which seemingly is selling like hot cakes, but for the genuineness of which we would not vouch. Under the present buoyancy, many shares may be sold at reported prices, but the advance is altogether too sudden to be fully real, and, in this respect, we would caution parties about being over-anxious to invest, for this is the opportunity for the free manipulation of all those claims that have no merit whatever."

The sales at the San Francisco Board for the week ending August 27th amounted to $4,000,000, distributed among dealings in one hundred and fourteen different stocks, at prices ranging from 25 cents to $50 per share, and with sales of from 50 to over 28,000 shares.

The quotations of Overman have been fairly maintained during the business of the week. This company has, however, probably taking advantage of the favorable condition of the market, levied an assessment to-day of $3 per share, amounting to about $100,000. The last one was levied in April, 1878, of the same amount. This company has collected on this account about $3,300,000, and never paid its stockholders a dollar. Chollar-Potosi has levied an assessment of $5 per share, equal to $140,000. The last assessment of this company was $3 per share, levied in January last. This stock closed at $35.50 per share, against $39 a week ago. Eureka Consolidated opens to-day, at $38 per share, which is decidedly the lowest quotation of the week, and lower than we have noted for some time past. From all that we can learn from our correspondents, and through our exchanges, we see no cause for the decline in the stock of this company. We append below an official letter from the mine, dated August 24th, from which it will be seen that the apparent decreasing value of the mine is from other sources than that of the mine itself.

"Very good progress has been made in mining operations this week, there having been some 265 feet of

drifts, etc., run since last report. The ore-bodies are all looking full as well as ever, and continue to yield their full quota of ore. The furnaces have been running much better this week than during the first two weeks of the month, having turned out some 340 tons of bullion, the product of 1600 tons of ore. The bullion has improved in value, as the ore is of a better grade than that worked during the first part of the month."

The continued splendid appearance and remarkable output of some of the prominent mines of the Bodie District has a very great influence on the market, and coming, as it does, in connection with the new lease of life and influence which is given to the Comstock, is all the greater reason for investors to keep clear of the batch of worthless properties which it will be attempted to foist upon them. The output of the Bodie Mine for the month of August will amount to nearly $700,000, out of which the company has declared dividends aggregating $8 per share, with a prospect of more to follow.

*Assessments*, with dates when delinquent: Phœnix, 50c., September 30th; Champion, 10c., September 27th; Rye Patch Cons., $1, October 1st; Endowment, 50c., September 30th; Pliocene, 10c., September 30th; North Dayton, 25c., September 30th; Golden Fleece Gravel, $50, September 28th; Echo, 2c., September 26th; Tip Top, 50c.; Cholar Potosi, $5; Overman, $3.

*The Silver King Mining Co.* has declared a dividend of 50c. per share, amounting to $50,000.

*The South Standard Mining Co.* has declared a stock dividend of the increased capital stock. All holders of certificates receiving 2 shares of the new for one of the old.

NEW INCORPORATIONS.

We note the recent organization of the following companies, in addition to those announced in our issue of July 27th:

| | | |
|---|---|---|
| California Gold Mining Co., | Cal | $10,000,000 |
| Cons. Pacific Mining Co., | " | 6,000,000 |
| Crœsus G. and S. Mining Co., | " | 5,000,000 |
| Defiance Gold Mining Co., | " | 5,000,000 |
| Don Quixote Mining Co., | " | 10,000,000 |
| Gibbonsville Gold Mining Co., | " | 110,000 |
| Last Resort Mining Co., | " | 5,000,000 |
| Lone Ridge Gravel Mining Co., | " | 24,000 |
| Mono and Cross Cons. Mining Co., | " | 10,000,000 |
| Monte Aquacata Mining Co., | " | 500,000 |
| Mount Blanc Cons. Gravel Mining Co., | " | 1,000,000 |
| North Fork Gold Mining Co., | " | 500,000 |
| Old Dan Gold and Silver Mining Co., | " | 10,000,000 |
| Quartz Mt. Gold Mg. and Tunnel Co., | " | 5,000,000 |
| Queen Bee Mining Co., | " | 6,000,000 |
| R. E. Lee Tunnel and Mining Co., | " | 6,000,000 |
| Sophia Gravel Mining Co., | " | 5,000,000 |
| South Bodie Mining Co., | " | 10,000,000 |
| Wind Up Gravel Mining Co., | " | 100,000 |
| J. Baldwin Min'g and Reduc. Co., | Colo | 500,000 |
| Lee Mining and Smelting Co., | " | 75,000 |
| San Juan Central Mining Co., | " | 5,000,000 |
| Staatsburg Mining Co., | " | 60,000 |
| Welch Coal Co., | " | 50,000 |
| Esmeralda Mining Co., | Nev | 10,000,000 |
| Highbridge Silver Mining Co., | " | 10,000,000 |
| Jersey Mining Co., | " | 10,000,000 |
| Senator Mining Co., | " | 10,000,000 |
| South Comstock Cons. Mining Co., | " | 10,000,000 |
| Calabasas Land and Mining Co., | Ariz | 10,000,000 |
| Bohemia Silver Mining Co., | " | 10,000,000 |
| Ruby Silver Mining Co., | " | 1,000,000 |
| St. Louis Mining and Smelting Co., | Mo | 250,000 |
| Meyer Mining Co., | " | 220,000 |
| Applegate Grand Mining Co., | Or | 500,000 |
| American Lithographic Stone and Mining Co., | Ky | |
| Coal River Cannel Co., | W. Va | 500,000 |

*The Rocky Bar Gold Mining Co., of Nevada*, has increased its capital stock from $66,000, divided into eleven shares, to $220,000, consisting of 22,000 shares.

*Stock Dividends* The Lady Washington stockholders received on September 2d nine tenths of a share of Benton Cons., and nine tenths of a share of Lady Washington Cons.; for every share of Lady Washington, a Benton shareholder received five tenths of a share of Benton Cons.; and a Boyle stockholder received for every share five tenths of a share of Lady Washington Cons.


A LARGE INTEREST

IN ONE OF THE FINEST

GOLD MINING PROPERTIES

IN THE SOUTH,

is offered to a person desirous of entering into active mining operations; $5,000 required.

This property is very favorably reported upon by the most eminent authorities, and has an indisputable record as to past yield, etc., which compares favorably with that of the best-known gold-mining properties in the West.

Address BONNER,
ENGINEERING AND MINING JOURNAL Office.

THE Pocket Microscope, $1

Magnifies 1000 times; is needed by every mechanic. Is of great practical use to Miners, Mechanics, Farmers, Botanists, Physicians, Teachers, etc. It is the best instrument ever invented for examining minerals, the edges and points of tools, or for the DETECTION OF FLAWS in material. Sent, post-paid, on receipt of $1. GEM MICROSCOPE CO., 156 Fulton Street, New York. Agents wanted.

GRANVILLE GOLD COMPANY.

Incorporated November 10th, 1876.

Capital, $1,000,000. 100,000 Shares, par value $10.

For the purpose of erecting additional machinery, a limited number of shares are now offered for sale. Send for prospectus to the Company's Office, 23 Dey street, New York, Room 1, where subscription books are now open.

EDWIN H. MULFORD, Sec.

THE PLUMAS

National Quartz Mining Company of California.

Capital, $1,000,000.

100,000 Shares, Par Value, $10.00.

C. W. REED, President, Sacramento City.
A. P. MARSHALL, Secretary and Assistant Treasurer, New York.
REGISTRY OFFICE, FARMERS' LOAN AND TRUST CO
Office of Company, 54 Broad street, N. Y.
*Dividends payable monthly.*

A

"HARD PAN" INVESTMENT.

A syndicate is being formed to purchase and incorporate a very valuable mining property now in position to pay large dividends. The fullest information as to value, title, etc., is given on the most reliable authority. Everything is **BONA FIDE AND HONEST,** and there are large fortunes for those forming the syndicate.

Persons applying should have not less than $10,000 available. Address GOLD, care of ENGINEERING AND MINING JOURNAL, P. O. Box 4404, New York.

LA LIGUA GOLD MINING CO.

This company is organized under the laws of the State of New York, with a capital stock of 50,000 shares of $100 each "fully paid" and free from any assessment for the purpose of working the "Catapilco Gold Mines" in Chili, South America.

The Catapilco Gold Mines are located on an estate of the same name, in the Province of Aconcagua, some fifty miles north of Valpariso.

The property owned by this company, including the area covered by its water right, consists of over 25,000 acres of land, of which fully 2800 acres is auriferous gravel, varying in depth from 28 to 150 feet, with an average value of from 48c. to over $1 per cubic yard. Twelve miles of canal is built, and the Hydraulic Machinery for working the mines has been in operation since June 1st, 1878.

The only stock to be sold in this country is in the hands of John Hitchcock, President of Commonwealth Insurance Company of Boston, where samples of gold may be seen and all information regarding the mine obtained.

E. C. CONVERSE, Treasurer. JOHN H. FLAGLER, President.


## ADVERTISERS' INDEX.


**Air Compressors:** *Page.*
Clayton, James, Brooklyn, N. Y ... iii
Griffith & Wedge, Zanesville, Ohio ... v
Rand & Waring, New York ... x

**Assaying Tools and Chemicals:**
Benjamin, E. B., New York ... ii
Kreischer, B. & Sons, New York ... i

**Attorneys and Counselors:**
Britton & Gray, Washington, D. C ... vi
Drinker, Henry S., Philadelphia, Pa ... vi
Morrison & White, Georgetown, Col ... vi

**Bankers and Brokers:**
Van Deventer & Patton, New York ... vi

**Belting and Rubber:**
Gutta Percha & Rubber Mfg. Co., N. Y .. v
N. Y. Belting & Packing Co., New York .. v

**Blasting Powder:**
Laflin & Rand Powder Co., New York .... v
Miners' Supply Co., St. Clair, Pa ... ii
Oliver, Paul A., Wilkes-Barre, Pa ... v

**Boilers:**
Abendroth & Root Mfg. Co., New York .. x
Babcock & Wilcox, N. Y ... vi
St. Louis Boiler Yard ... —

**Boiler Tubes:**
Eagle Tube Co ... v

**Books and Periodicals:**
Accidents in Mines ... iii
American Journal of Science and Art ... vii
Capital and Labor, London, Eng ... vii
Coal Trade Review of the U. S. ... vii
Colliery Guardian, London, Eng ... vii
Engineering, London, Eng ... vii
La Houille, Paris, France ... vii
Miners' Journal, Pottsville, Pa ... vii
Magnetic Variation in America ... ii
Polytechnic Review ... v
Spon, E. & F. N., New York ... ix
Teknisk Tidskrift, Stockholm, Sweden ... vii
The Brick, Pottery and Glass Journal ... ii

**Cement:**
White, J. B. & Bros ... iv

**Clocks:**
Seth Thomas, Thomaston, Conn ... iii

**Coal:**
Berwind, White & Co., New York ... ix
Borda, Eugene (Koh-i-noor Coal), Phila ... viii
Borden & Lovell, New York ... viii
Brown, S. H., & Co., New York ... viii
Consolidation Coal Co., Baltimore, Md ... ix
Coxe Bros. & Co., New York ... ix
Cox & Boyce, New York ... viii
Heissenbuttel & Wells, New York ... ix
Hoboken Coal Co., New York ... ix
Kanawha Coal Lands for Sale ... ix
Kittaning Coal Co., Philadelphia, Pa ... viii
Lehigh Valley Coal Co., New York ... viii
Maryland Coal Co., New York ... ix
New Central Coal Co., New York ... ix
Philadelphia & Reading Coal & Iron Co ... viii
Shaw Brothers, Baltimore, Md ... i
Swords, A. S., New York ... ix
Wilson, G. R. & Co., Buffalo, N. Y ... ix
Whitney, McCreary & Kemmerer, N. Y ... —

**Coal and Ore Separators:**
Bradford H., Philadelphia ... v
Fraser, Chalmers & Co., Chicago, Ill ... ix

**Dealers in Mining Properties:**
Ashton & Doyle, New York ... vi

**Educational:**
Colorado State School of Mines ... vi
Boston University School of Medicine ... i

**Engineers and Chemists:**
Bradt, W. H., Leadville, Colo ... viii
Bates, Henry D. " " ... vii
Castner, H. Y., New York ... vii
Courtis, Wm. C., Wyandotte, Mich ... vii
Hill, John W., Hamilton, Ont ... vii
Johnson, Albert, Georgetown, Col ... vii
Keyes, W. S., San Francisco, Cal ... vii
Marsh, Geo. E., Georgetown, Col ... vii
Randolph, John C., New York ... vii
Reichenecker, Albert, Fairplay, Col ... vii
Rothwell, Richard P., New York ... vii
Rolker, Chas. M., Reno, Nevada ... vii
Vinton, Gen. Francis L., Denver, Col ... vii
Wilson Bros. & Co., Philadelphia ... vii
Wulsten, Carl, Rosita, Col ... vii

**Emery Wheels:**
New York Belting and Packing Co ... v

**Engineers' Instruments:**
Heller & Brightly, Philadelphia ... vi
Keuffel & Esser, New York ... vi

**Engraving:**
Photo-Engraving Co., New York ... vi

**Fire Brick:**
Kreischer, B., & Sons, N. Y ... i
Maurer, Henry, New York ... ii

**Gas Process:**
American Gas, Fuel and Light Co., Phila ... iv

**Hoisting Machinery:**
Crane Bros. Mf'g. Co., Chicago, Ill ... ii
Copeland & Bacon, New York ... x
Griffith & Wedge, Zanesville, O ... iv

**Hotels:**
International Hotel ... v
Teller House, Central City, Col ... v

**Hydraulic Jacks and Punches:**
Dudgeon, Richard, New York ... v
Lyon, E., & Co., New York ... ii

**Machinists' Tools & Machinery:**
The Pratt & Whitney Co ... vi

**Metal Brokers:**
White, Edward P., New York ... iv

**Mineral Wool:**
Elbers, Alexander D., New York ... vii

**Mining Bureau:**
Bixby, H. G ... vi

**Mining Companies:**
Granville Gold Co., New York ... 180
Plumas, G. & S., Mining Co., N. Y ... 180

**Mining, Crushing, Stamping and Smelting Machinery:**
Aitchison, R. & Co., Chicago, Ill ... iii
Blake's Stone Breaker, New Haven ... vi
Copeland & Bacon, New York ... x
Fraser, Chalmers & Co., Chicago, Ill ... ix

**Ore Bags:**
Bemis Bros. & Co., St. Louis ... viii

**Paints:**
Howard Fleming ... vi

**Painters:**
Upham, H. H., & Co., N. Y ... iv

**Patents:**
Stetson, Thomas D., New York ... iv

**Pumps:**
Cameron, A. S., New York ... iii
Clayton, James, Brooklyn ... iii
Crane Brothers Manufac'g Co., Chicago ... iii
Gould & Garrison, N. Y ... —
Hardick, Chas. B., Brooklyn, N. Y ... iii
Knowles Steam Pump New York ... i
Worthington, H. R., New York ... iii
Wright, Wm ... v

**Railway Train Brakes:**
Prosser, Thos., & Co., New York ... iv

**Railroads and Transportation:**
Atchison, Topeka & Santa Fe R. R ... viii
Colorado Central R.R ... viii
Denver & Rio Grande R.R ... viii
Missouri, Kansas & Texas R.R ... viii
New York & Philadelphia New Line ... —
Pennsylvania R.R ... viii

**Roofs, Girders, etc.:**
Scaife, Wm. B., & Sons, Pittsburg, Pa ... v

**Rock Drills:**
Am. Diamond Rock Boring Co., N. Y ... x
Burleigh Rock Drill Co., New York ... x
Ingersoll Rock Drill Co., New York ... x
Penn. Diamond Drill Co., Pottsville, Pa ... x
Rand & Waring, New York ... x

**Safes and Scales:**
Marvin Safe & Scale Co., New York ... i

**Smelting and Refining Works:**
Robertson, J. R., N. Y ... v
Stetefeldt Furnace Co., San Francisco, Cal ... x

**Steam Engines:**
Todd, Joseph C ... iii
Fraser, Chalmers & Co., Chicago ... iii
Wright, Wm ... v

**Steel Works:**
Crescent Steel Works, Pittsburg, Pa ... ii
Park, Bro., & Co., Pittsburg ... ii

**Tubes and Pipes:**
Worthington, H. R., New York ... iii
Abendroth & Root Mf Co., New York ... x

**Water Wheels:**
Alcott's, Mount Holly, N. J ... ii
Stillwell and Bierce M'f'g Co., Dayton, O ... iv
Leffell, James, & Co., Springfield, O ... iv

**Wire Rope:**
Hazard Mfg. Co., Wilkes-Barre, Pa ... iii
Mason, John W. & Co., New York ... i
Roebling's, John A., Sons, Trenton, N. J ... x

**Miscellaneous:**
Capital Wanted ... i
Dividend Notice, &c ... i
Partner Wanted ... i
Situation Wanted by an experienced Engineer ... i